THE ASHCROFT MANUFACTURING COMPANY

85-87-89 LIBERTY ST.
NEW YORK

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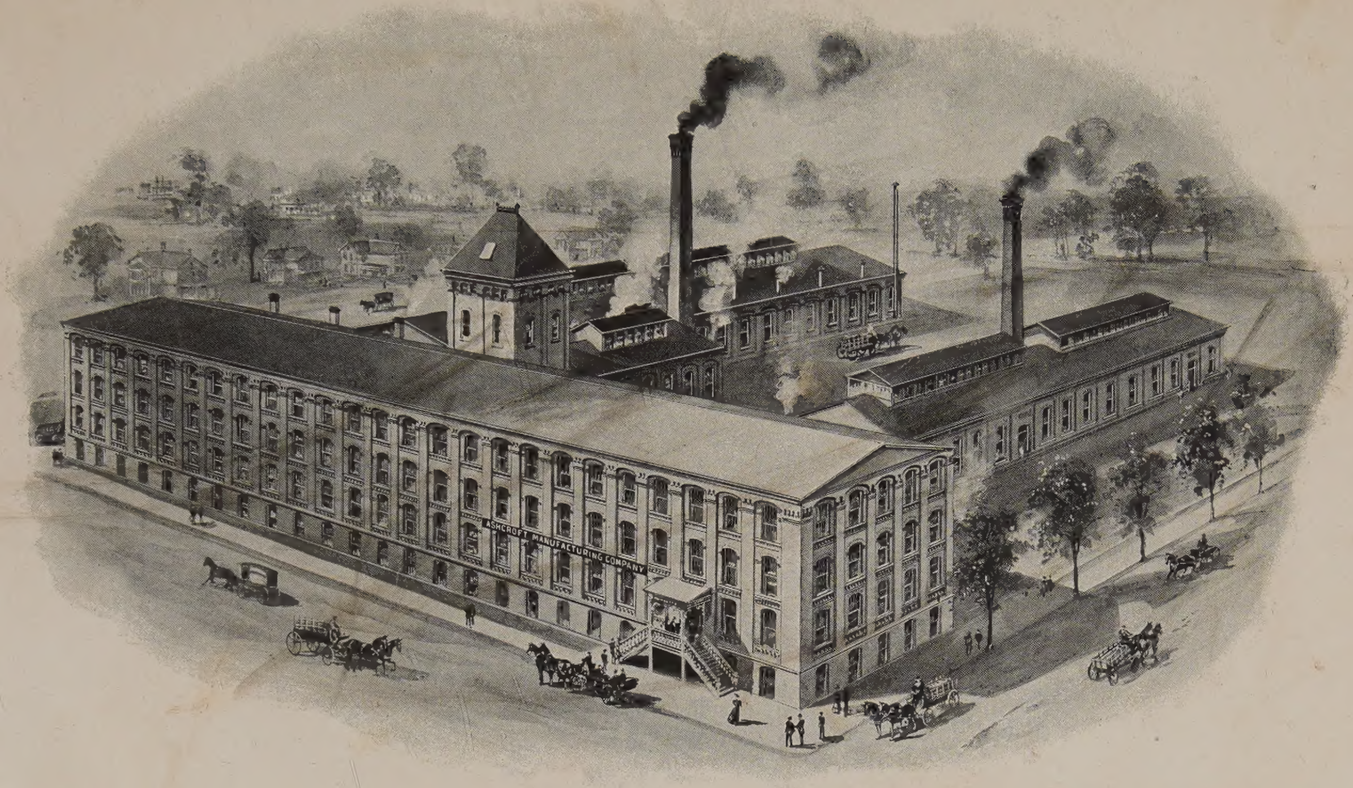


View of Factories of THE ASHCROFT MANUFACTURING COMPANY, at Bridgeport, Conn.

CINCINNATI INDUSTRIAL
EXPOSITION
INVENTION
MUSIC
1885
INTERNATIONAL INVENTIONS EXHIBITION
ROYAL CORNWALL POLYTECHNIC SOCIETY INSTITUTED 1833
FIRST CLASS
AWARDED BY THE WORLDS INDUSTRIAL AND COTTON CENTENNIAL EXPOSITION
NATIONAL EXHIBITION
AWARDED BY UNITED STATES CENTENNIAL COMMISSION
DELPHIA MDCCCLXXVI
WORLD'S COLUMBIAN EXPOSITION IN COMMEMORATION OF THE FOUR HUNDREDTH ANNIVERSARY OF THE LANDING OF COLUMBUS MDCCCXCII - MDCCCXCIII
TO THE ASHCROFT MFG. CO.
NEW ORLEANS
1884-5
CHRISTOPHER COLVMBVS OCT XI MCCCCXCII

THE ASHCROFT MANUFACTURING COMPANY

Original Steam Gauge Works

Established 1851

Charles A. Moore,	President and General Manager
H. S. Manning,	Treasurer
M. Luscomb,	Secretary and Assistant Treasurer

MANUFACTURERS OF

Steam Gauges
Vacuum Gauges
Water Gauges
Altitude Gauges
Chemical Gauges
Locomotive Gauges
Ammonia Gauges
Hydraulic Gauges
Test Gauges
Chime Whistles
Tabor Speed Counters
Pantographs
Planimeters
Rotary Oil Pumps
Fusible Plugs
Furnace Doors
Grate Bars
Oil Cups
McCracken Steam Traps
Royle Steam Traps
Pipe Taps and Reamers
Chain Tongs
Packer Ratchets
Spring Balances
Edson Recording and Alarm-Gauges
Pyrometers
Revolution Counters
Marine and Engine-room Clocks
Gauge Cocks
Steam Gauge Siphons
Keyser Automatic Water Gauges
Locomotive Gauge Cocks
Water Columns
Test Pumps
Gauge Glass Cutters
Tabor Steam Engine Indicators
Coffin Averagers
Oil Testing Machines
Low-water Detectors and Alarms
Watchman's Clocks
Steam Syrens
Thermometers
Moscrop Speed Recorders
Pipe Stocks and Dies
Brown's Adjustable Pipe Tongs
Pipe Vises, Cutters, and Wrenches
Common Pipe Tongs

MAIN OFFICES AND SALESROOMS

85-87-89 LIBERTY STREET, NEW YORK, N. Y.

FACTORIES BRIDGEPORT, CONN.

BRANCH OFFICES
CHICAGO, ILL., AND PITTSBURGH, PA.

THE WINTHROP PRESS, NEW YORK

New York, N. Y., February 1, 1900.

To Our Customers:

This 1900 catalogue, which we have endeavored to make complete in every detail, illustrates and describes a varied line of high-grade specialties and articles manufactured and sold by this Company.

The business of this Company was established in 1851 by the original manufacture and first introduction in this country of Pressure and Vacuum Gauges. Many additions of meritorious devices have been made to our business from time to time, which, with the redesigning of and improvements in some of our earlier manufactures to keep pace with the yearly increasing and more exacting demands of our customers, enables us to offer at the present time a very complete line of reliable and durable steam measuring and recording instruments.

The Ashcroft Pressure Gauge, the Edson Pressure-Recording and Alarm-Gauge, the Ashcroft Revolution Counter, the Keyser Automatic Water Gauge, the Moscrop Speed Recorder, the Tabor Steam Engine Indicator, and many other articles shown in this catalogue, all of which we have manufactured and sold for many years past, are so widely known as to be universally recognized as instruments of precision of the highest grade, that can be relied upon under the most severe conditions of intelligent use.

Our factory is well and fully equipped with modern tools, which, combined with the constant employment of a large force of skilled mechanics with long experience in our line of manufactures, ensures the maintenance of the high standard of our productions, as well as the prompt shipment of all orders, and we respectfully solicit a continuance of your favors so liberally shown us in the past.

Yours truly,

THE ASHCROFT MFG. CO.

The William Cramp & Sons' Ship and Engine Building Co.

PHILADELPHIA, January 20, 1899.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : In regard to the Ashcroft Auxiliary Spring Bourdon Pressure Gauge, we beg to say that we have used these Gauges on most all of the ships that we have built at our yards, with entire satisfaction.

In all of the official trials of the vessels for the United States Navy built by us the boiler pressures have always been governed by this type of Gauge.

Yours truly,

(Signed) EDWIN S. CRAMP, Superintending Engineer.

TRADE MARK.
THE
ASHCROFT
MFG. CO.
Bridgeport
and
New York.
1898.
SOLID DRAWN TUBE
WARRANTED.
REGISTERED.
APRIL. 12TH 1898.

Newport News Shipbuilding and Dry Dock Company

NO. 1 BROADWAY, NEW YORK, January 3, 1899.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Dear Sirs : We take great pleasure in bearing testimony to the excellence of the Steam Gauges manufactured by your company, which we have used extensively for marine purposes, and which have given universal satisfaction wherever installed.

Manufacturers who, with painstaking effort, aim to keep abreast of the times, producing a first-class article, both in design and workmanship, deserve to prosper, and we are glad to see that the above-mentioned policy is bearing pleasant fruitage in your case.

With best wishes, we remain,

Sincerely yours,

(Signed) C. B. ORCUTT, President.

Treasury Department
Steamboat Inspection Service
Office of the Supervising Inspector-General

WASHINGTON, D. C., June 5, 1899.

THE ASHCROFT MANUFACTURING CO.
New York

Dear Sirs: In response to your request contained in letter of the 1st instant, I have to inform you that the Ashcroft Steam and Test Gauge, as per records in this office, was submitted to the Board of Supervising Inspectors at its annual meeting, January 18, 1872, and referred to the Committee on Safety Valves, Gauges, etc., and that on the following day, January 19, Mr. Menshaw, from the committee referred to, made the following report:

"The committee to whom was referred the Steam Recording Gauge presented by E. H. Ashcroft, report that in their opinion it is equal to any Recording Gauge that has been presented to this Board for its consideration. It will answer the requirements of the law and the rules of this Board; therefore we recommend its approval.

"(Signed) JOHN MENSHAW,
"(Signed) JOHN S. DEVENNEY."

I am pleased to inform you further that the Ashcroft Steam and Test Gauge, many of which have been used by the officers of the U. S. Inspection Service, since the date of their approval in 1872, have, so far as this office is informed on the subject, given entire satisfaction.

Very respectfully,

(Signed) JAS. A. DUMONT,
Supervising Inspector-General.

ASHCROFT STEAM OR PRESSURE GAUGES

With Single Bourdon Springs

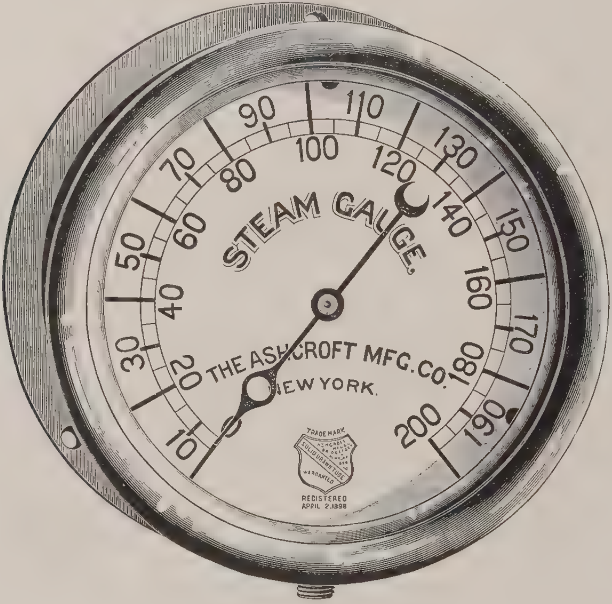


Fig. 300

These Gauges are adapted for steam, air, gas, water, and any fluid pressure that will not affect brass.

They can be graduated to any pressure not above 500 pounds per square inch. (For higher pressures, see Gauges on pages 40 and 41.)

GENERAL DESCRIPTION

These Gauges have non-corrosive movements. Springs are made from carefully selected, seamless drawn tubing. Dials are made of brass and silvered, with the figures and letters cut deep and filled with black enamel. Connections on sizes 3 inches and over are ¼-inch male pipe thread at bottom of Gauge, as shown in cut. They are all accurately and correctly graduated by open mercury column, are stamped with our trademark and warranted correct.

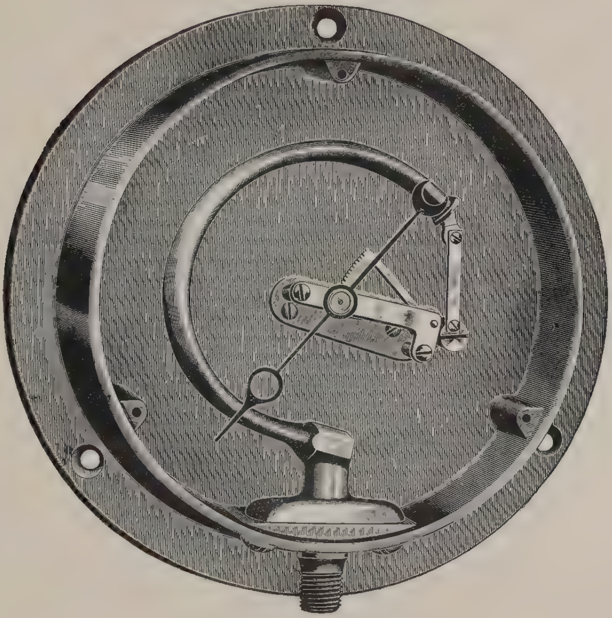
OPTIONS

These Gauges can be furnished with black dials and silvered letters and figures, with connection on back of case, with customer's name and address cut in dials, if so stated in order.

For prices, see next page.

ASHCROFT STEAM OR PRESSURE GAUGES

With Single Bourdon Springs



Sectional View

Fig. 301

PRICES EACH

Including Cock for Each Gauge

Size	Iron Case, Brass Ring	Iron Case, Nickeled Ring	Brass Case	Nickeled Case	Brass Deep Case	Nickeled Deep Case
12-inch Dial . . .	$50.00	$51.50	$75.00	$79.00	$80.00	$84.00
10 " . . .	32.00	33.00	40.00	43.00	44.00	47.00
8½ " . . .	22.00	22.75	30.00	32.50	33.50	36.00
6¾ " . . .	16.00	16.60	20.00	22.00	23.00	25.00
6 " . . .	13.00	13.50	16.00	17.50	. . .	. . .
5½ " . . .	10.00	10.25	12.00	13.25	. . .	. . .
5 " . . .	8.00	8.20	11.00	12.00	. . .	. . .
4½ " . . .	8.00	8.20	10.00	11.00	. . .	. . .
3½ " . . .	7.00	7.18	9.00	9.75	. . .	. . .
2½ " . . .	6.00	6.15	8.00	8.60	. . .	. . .

Siphons must be attached to these Gauges when they are used for steam pressures to prevent anything but water entering the spring of the Gauge. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressure, should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT STEAM OR PRESSURE GAUGES

With Double Bourdon Springs

Lane's Improvement

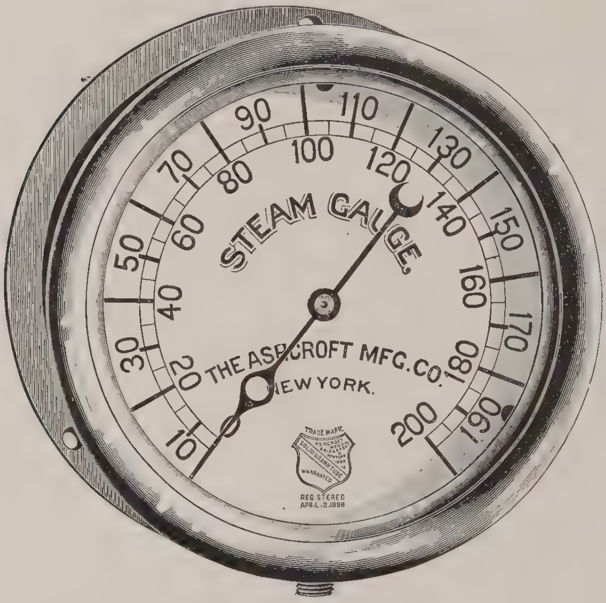


Fig. 302

These Gauges will give good service where it is impracticable to use a Single-Spring Bourdon Gauge. They are so constructed that they will drain themselves, and, when subjected to vibration and general severe usage, will prove more reliable than a regular Single-Spring Gauge.

GENERAL DESCRIPTION

These Gauges have non-corrosive movements. Springs are made from carefully selected, seamless drawn tubing. Dials are made of brass and silvered, with the figures and letters cut deep and filled with black enamel. Connections on sizes 3 inches and over are ¼-inch male pipe thread at bottom of Gauge, as shown in cut. They are all accurately and correctly graduated by open mercury column, are stamped with our trademark and warranted correct.

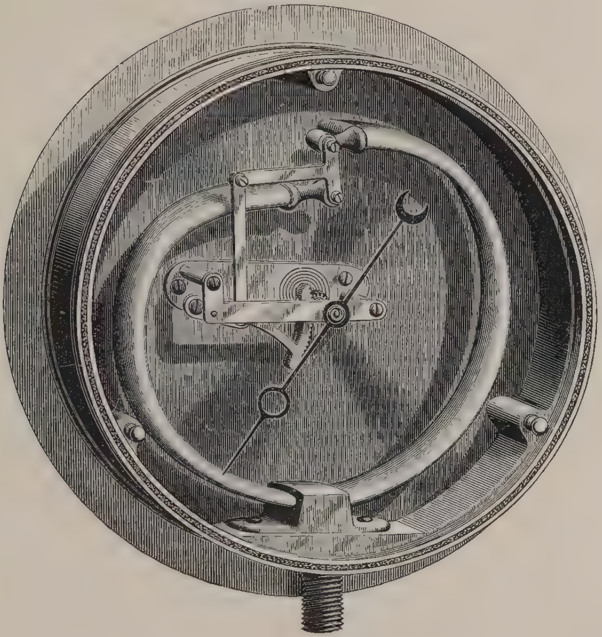
These Gauges can be furnished with black dials and silvered letters and figures, with connection on back of case, with customer's name and address cut in dials, if so stated in order.

For prices, see next page.

ASHCROFT STEAM OR PRESSURE GAUGES

With Double Bourdon Springs

Lane's Improvement



Sectional View

Fig. 303

PRICES EACH

Including Cock for Each Gauge

Size	Iron Case, Brass Ring	Iron Case, Nickeled Ring	Brass Case	Nickeled Case	Brass Deep Case	Nickeled Deep Case
12-inch Dial . .	$55.00	$56.50	$80.00	$84.00	$85.00	$89.00
10 " . .	37.00	38.00	45.00	48.00	49.00	52.00
8½ " . .	25.00	25.75	34.00	36.50	37.50	40.00
6¾ " . .	18.00	18.60	22.00	24.00	25.00	27.00
6 " . .	15.00	15.50	18.00	19.50	. . .	. . .
5½ " . .	12.00	12.25	14.00	15.25	. . .	. . .
5 " . .	11.00	11.20	13.00	14.00	. . .	. . .
4½ " . .	10.00	10.20	12.00	13.00	. . .	. . .

Siphons must be attached to these Gauges when they are used for *steam* pressures to prevent anything but water entering the spring of the Gauge. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressures, should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT VACUUM GAUGES

With Single Bourdon Springs

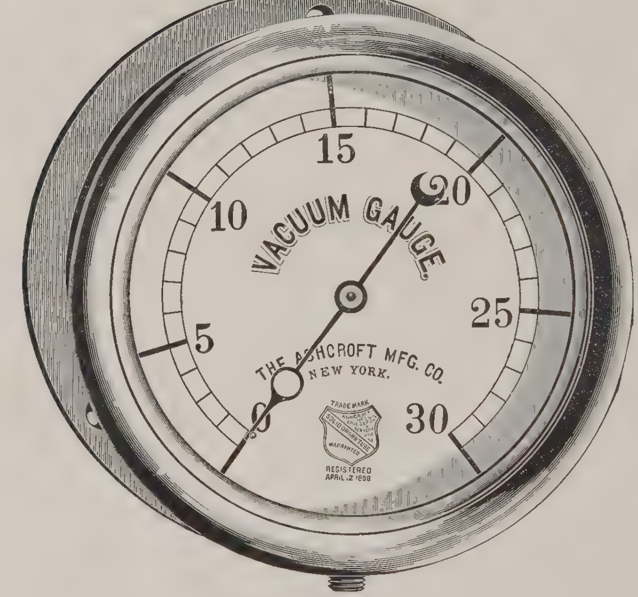


Fig. 304

These Gauges are generally graduated to 30 inches, as shown in cut.

GENERAL DESCRIPTION

These Gauges have non-corrosive movements. Springs are made from carefully selected, seamless drawn tubing. Dials are made of brass and silvered, with the figures and letters cut deep and filled with black enamel. Connections on sizes 3 inches and over are ¼-inch male pipe thread at bottom of Gauge, as shown in cut. They are all accurately and correctly graduated by open mercury column, are stamped with our trademark and warranted correct.

OPTIONS

These Gauges can be furnished with black dials and silvered letters and figures, with connection at back of case, with customer's name and address cut in dials, if so stated in order.

For prices, see next page.

ASHCROFT VACUUM GAUGES

With Single Bourdon Springs

PRICES EACH

Including Cock for Each Gauge

Size	Iron Case, Brass Ring	Iron Case, Nickeled Ring	Brass Case	Nickeled Case	Brass Deep Case	Nickeled Deep Case
12-inch Dial . . .	$50.00	$51.50	$75.00	$79.00	$80.00	$84.00
10 " . . .	32.00	33.00	40.00	43.00	44.00	47.00
8½ " . . .	22.00	22.75	30.00	32.50	33.50	36.00
6¾ " . .	16.00	16.60	20.00	22.00	23.00	25.00
6 " . . .	13.00	13.50	16.00	17.50	. . .	. . .
5½ " . . .	10.00	10.25	12.00	13.25	. . .	. . .
5 " . . .	8.00	8.20	11.00	12.00	. . .	. . .
4½ " . . .	8.00	8.20	10.00	11.00	. . .	. . .
3½ " . . .	7.00	7.18	9.00	9.75	. . .	. . .
2½ " . . .	6.00	6.15	8.00	8.60	. . .	. . .

When ordering note that the dials of these Gauges are graduated to 30 inches. They can be graduated in equivalent pounds, if so stated when ordering.

ASHCROFT STEAM OR PRESSURE GAUGES

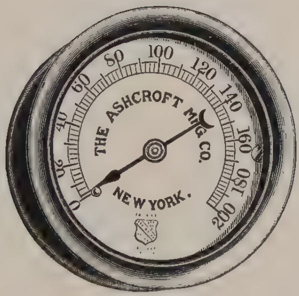


Fig. 305

This cut shows a 2½-inch dial brass case Gauge, full description of which will be found on pages 12 and 13. They are used largely on Naptha Launches, Portable Lights, Carbonating Apparatus, etc.

For prices, see page 13.

ASHCROFT AUXILIARY SPRING PRESSURE GAUGES

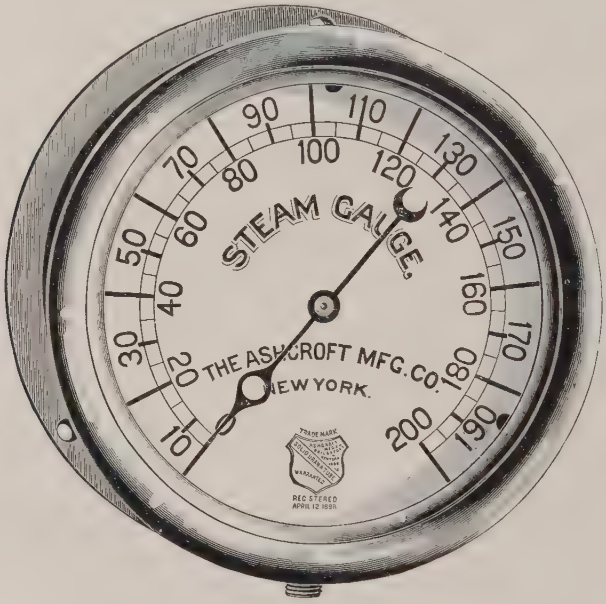


Fig. 306

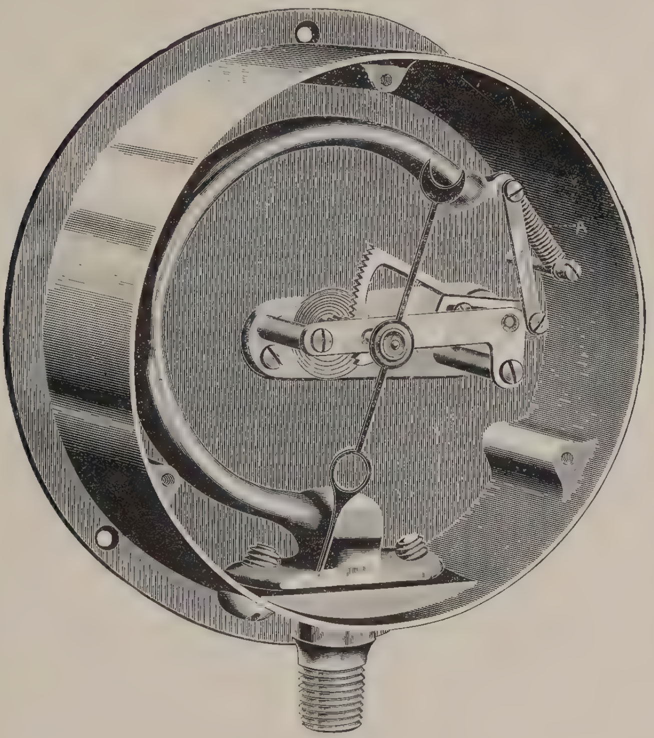
These Gauges are adapted for use on Steam Fire Engines, Marine Engines, and for high-pressure service in general, where extreme accuracy and durability is required. We recommend them for use where single and double Bourdon Tube Gauges have been found wanting.

GENERAL DESCRIPTION

The construction of this style of Gauge is the result of our efforts to provide an accurate and durable Gauge that would overcome the defect of permanent set of springs in Gauges of the single or double Bourdon type, irrespective of their length or the method of connecting to their movements or the cross section of their tubes, and the experience of our customers has demonstrated that this Gauge is the most accurate and durable on the market. An independent co-operating spiral spring (see "A" in sectional view) is applied to the free end of the single Bourdon tube, which enables us to reduce the wearing and friction of joints to the least possible number —two only. The Bourdon tube is short enough to drain itself, and the Gauge is very quick to act, and responsive to the slightest change in pressure. It is graduated by open mercury column, stamped with our trademark and warranted correct.

For prices, see next page.

ASHCROFT
AUXILIARY SPRING PRESSURE GAUGES



SECTIONAL VIEW

Fig. 307

PRICES EACH

Including Cock to Each Gauge

SIZE	IRON CASE, BRASS RING	IRON CASE, NICKELED RING	BRASS CASE	NICKELED CASE	BRASS DEEP CASE	NICKELED DEEP CASE
12-inch Dial . .	$55.00	$56.50	$80.00	$84.00	$85.00	$89.00
10 " . .	37.00	38.00	45.00	48.00	49.00	52.00
8½ " . .	25.00	25.75	34.00	36.50	37.50	40.00
6¾ " . .	18.00	18.60	22.00	24.00	25.00	27.00
6 " . .	15.00	15.50	18.00	19.50	. . .	. . .
5½ " . .	12.00	12.25	14.00	15.25	. . .	. . .
5 " . .	11.00	11 20	13.00	14.00	. . .	. . .
4½ " . .	10.00	10.20	12.00	13.00		. . .

Siphons must be attached to these Gauges when used on steam pressures to prevent anything but water entering the spring of the Gauge. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressure, should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT
COMPOUND PRESSURE AND VACUUM GAUGES

With Single Bourdon Springs

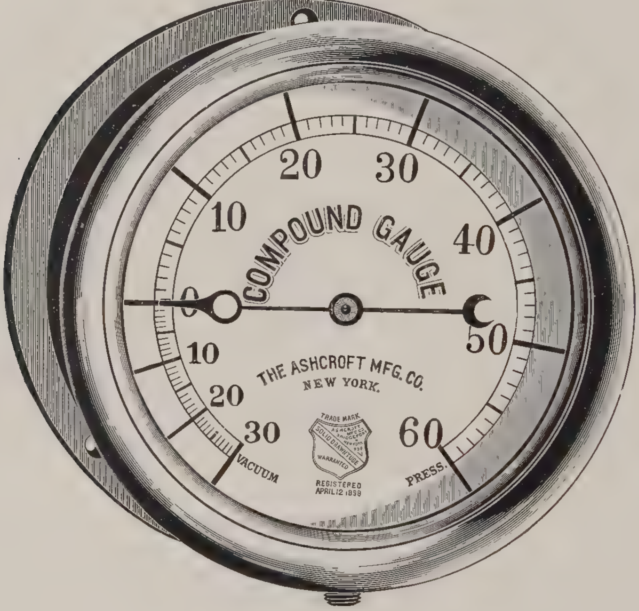


Fig. 308

These Gauges are used principally on Compound Engines, and are generally graduated to 60 pounds pressure and 30 inches vacuum, as shown in cut.

GENERAL DESCRIPTION

These Gauges have non-corrosive movements. Springs are made from carefully selected, seamless drawn tubing. Dials are made of brass and silvered, with the figures and letters cut deep and filled with black enamel. Connections on sizes 3 inches and over are ¼-inch male pipe thread at bottom of Gauge, as shown in cut. They are all accurately and correctly graduated by open mercury column, are stamped with our trademark and warranted correct.

OPTIONS

These Gauges can be furnished with black dials and silvered letters and figures, with connection at back of case, with customer's name and address cut in dials, if so stated in order.

For prices, see next page.

ASHCROFT
COMPOUND PRESSURE AND VACUUM GAUGES

With Single Bourdon Springs

PRICES EACH

Including Cock for Each Gauge

SIZE	IRON CASE, BRASS RING	IRON CASE, NICKELED RING	BRASS CASE	NICKELED CASE	BRASS DEEP CASE	NICKELED DEEP CASE
12-inch Dial . .	$60.00	$61.50	$80.00	$84.00	$85.00	$89.00
10 " . .	40.00	41.00	50.00	53.00	54.00	57.00
8½ " . .	30.00	30.75	40.00	42.50	43.50	46.00
6¾ " . .	20.00	20.60	25.00	27.00	28.00	30.00
6 " . .	16.00	16.50	20.00	21.50	. . .	. . .
5½ " . .	14.00	14.25	16.00	17.25	. . .	. . .
5 " . .	14.00	14.25	16.00	17.25	. . .	. . .
4½ " . .	12.00	12.20	14.00	15.00	. .	. . .
3½ " . .	10.00	10.18	12.00	12.75	. . .	. . .

Siphons must be attached to these Gauges when used for *steam* pressures to prevent anything but water entering the spring of the Gauge. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the pressure side of the Gauge graduated. All Pressure Gauges, particularly when used under steam pressure, should be graduated to double their highest working pressure to ensure the greatest durability The vacuum side of the Gauge can be graduated in equivalent pounds, if so stated when ordering.

ASHCROFT
COMBINATION WATER PRESSURE GAUGES

With Single Bourdon Springs

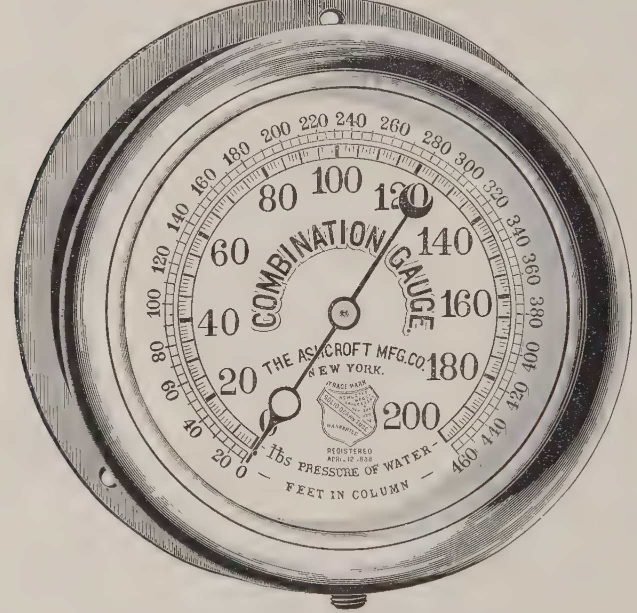


Fig. 309

These Gauges are made for use in waterworks, pumping stations, mines, etc., and have two sets of graduations, one showing pounds pressure to the square inch, and the other height of water in feet.

GENERAL DESCRIPTION

These Gauges have non-corrosive movements. Springs are made from carefully selected, seamless drawn tubing. Dials are made of brass and silvered, with the figures and letters cut deep and filled with black enamel. Connections on sizes 3 inches and over are ¼-inch male pipe and thread at bottom of Gauge, as shown in cut. They are all accurately and correctly graduated by open mercury column, are stamped with our trademark and warranted correct.

OPTIONS

These Gauges can be furnished with black dials and silvered letters and figures, with connection at back of case, with customer's name and address cut in dials, if so stated in order.

For prices, see next page.

ASHCROFT
COMBINATION WATER PRESSURE GAUGES

With Single Bourdon Springs

PRICES EACH

Including Cock for Each Gauge

SIZE	IRON CASE, BRASS RING	IRON CASE, NICKELED RING	BRASS CASE	NICKELED CASE	BRASS DEEP CASE	NICKELED DEEP CASE
12-inch Dial . . .	$60.00	$61.50	$80.00	$84.00	$85.00	$89.00
10 " . . .	40.00	41.00	50.00	53.00	54.00	57.00
8½ " . . .	30.00	30.75	40.00	42.50	43.50	46.00
6¾ " . . .	20.00	20.60	25.00	27.00	28.00	30.00
6 " . . .	16.00	16.50	20.00	21.50	. . .	. . .
5½ " . . .	14.00	14.25	16.00	17.25	. . .	. . .
4½ or 5-in. Dial	12.00	12.20	14.00	15.00	. . .	. . .

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT ALTITUDE GAUGES

With Single Bourdon Springs

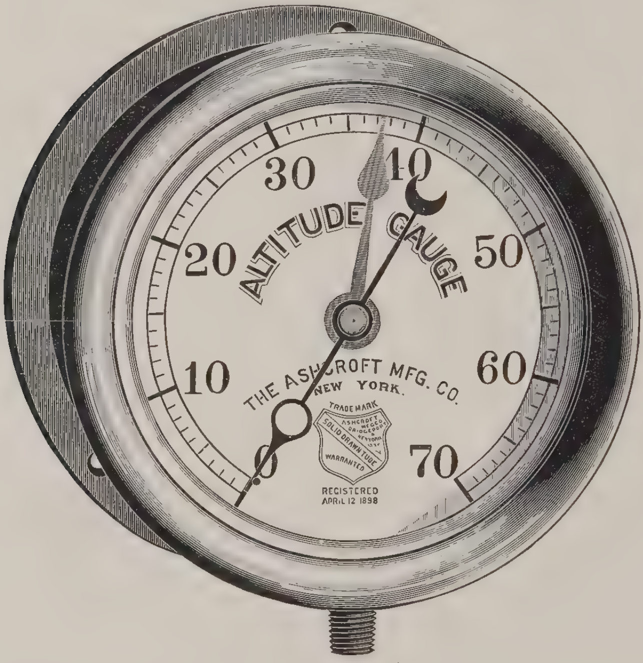


Fig. 310

These Gauges are used principally on hot-water heaters for showing the height of column of water in the reservoir or tank used with that system of heating. Their graduations are in feet, and generally for a maximum limit of 70 feet. The black hand is the operating one, and indicates the pressure. The index hand, which is painted red, can be placed at any desired pressure point on the dial to indicate the required height of the column of water in the reservoir or tank, and will remain stationary wherever it is set. The ring is fastened to the case with cotter pins, so that it can be easily and quickly removed.

GENERAL DESCRIPTION

These Gauges have non-corrosive movements. Springs are made from carefully selected, seamless drawn tubing. Dials are made of brass and silvered, with the figures and letters cut deep and filled with black enamel. Connections on sizes 3 inches and over are ¼-inch male pipe thread at bottom of Gauge, as shown in cut. They are all accurately and correctly graduated by open mercury column, are stamped with our trademark and warranted correct.

For prices, see next page.

ASHCROFT ALTITUDE GAUGES

With Single Bourdon Springs

OPTIONS

These Gauges can be furnished with black dials and silvered letters and figures, with connection at back of case, with customer's name and address cut in dials, if so stated in order.

PRICES EACH

Including Cock for Each Gauge

Size	Iron Case, Brass Ring	Iron Case, Nickeled Ring	Brass Case	Nickeled Case	Brass Deep Case	Nickeled Deep Case
12 inch Dial . .	$60.00	$61.50	$70.00	$74.00	$75.00	$79.00
10 " . . .	40.00	41.00	50.00	53.00	54.00	57.00
8½ " . . .	30.00	30.75	40.00	42.50	43.50	46.00
6¾ " . . .	20.00	20.60	25.00	27.00	28.00	30.00
6 " . . .	16.00	16.50	20.00	21.50	. . .	. . .
5½ " . . .	14.00	14.25	16.00	17.25	. . .	. . .
4½ or 5 " . . .	12.00	12.20	14.00	15.00	. . .	. . .

When ordering, do not fail to state the limit of feet to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressure, should be graduated to double their highest working pressure to ensure the greatest durability.

ASHCROFT PYROMETER GAUGES

With Single Bourdon Springs

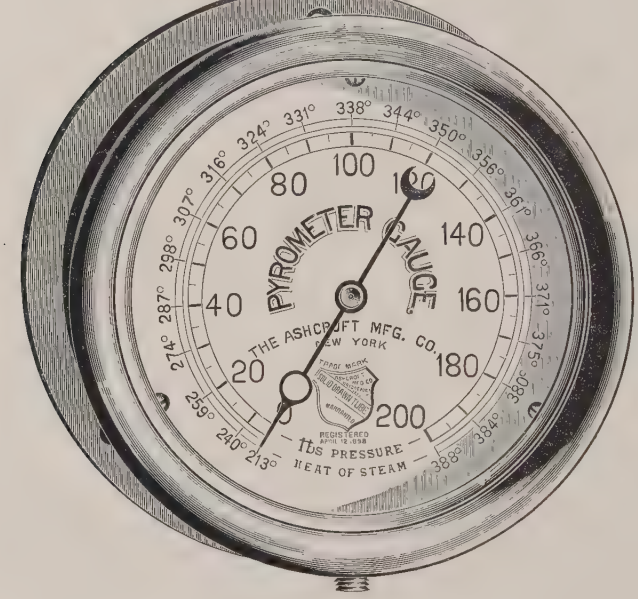


Fig. 311

This Gauge has two sets of graduations, the inner showing pounds pressure per square inch and the outer the corresponding temperatures in degrees Fahrenheit of the steam pressures.

PRICES EACH

Including Cock for Each Gauge

Size	Iron Case, Brass Ring	Iron Case, Nickeled Ring	Brass Case	Nickeled Case	Brass Deep Case	Nickeled Deep Case
12-inch Dial . .	$60.00	$61.50	$80.00	$84.00	$85.00	$89.00
10 “ . .	40.00	41.00	50.00	53.00	54.00	57.00
8½ “ . .	30.00	30.75	40.00	42.50	43.50	46.00
6¾ “ .	20.00	20.60	25.00	27.00	28.00	30.00
6 “ . .	16.00	16.50	20.00	21.50	. . .	. . .
5½ “ . .	14.00	14.25	16.00	17.25	. . .	. . .

A siphon must be attached to these Gauges to prevent anything but water entering the spring of the Gauge. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressure, should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT ALLEN OR CHEMICAL GAUGES

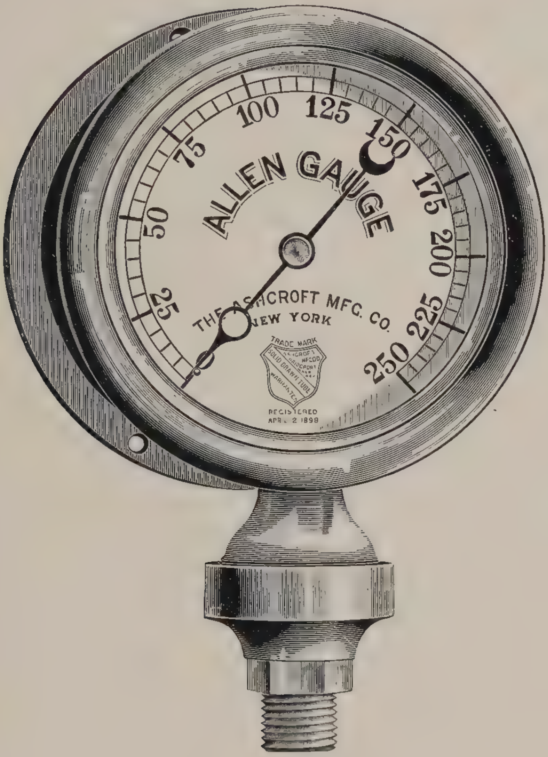


Fig. 312

These Gauges are designed especially for use on Bottling Machines, Soda Water Apparatus, and any service where the springs of the Gauges demand complete protection from the corroding action of the liquids and chemicals used. The mechanically sealed steel diaphragm within the bottom socket thoroughly protects all the interior working parts of the Gauge, as all the pressure is against its bottom side and cannot flow beyond.

PRICES EACH

Including Cock for Each Gauge

4½-inch Dial, Iron Case, Brass Ring	$10.00
5 “ “ “ “	12.00
4½ “ “ Brass Case	14.00
5 “ “ “	16.00

Prices of other sizes on application

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT
AUXILIARY SPRING LOCOMOTIVE GAUGES

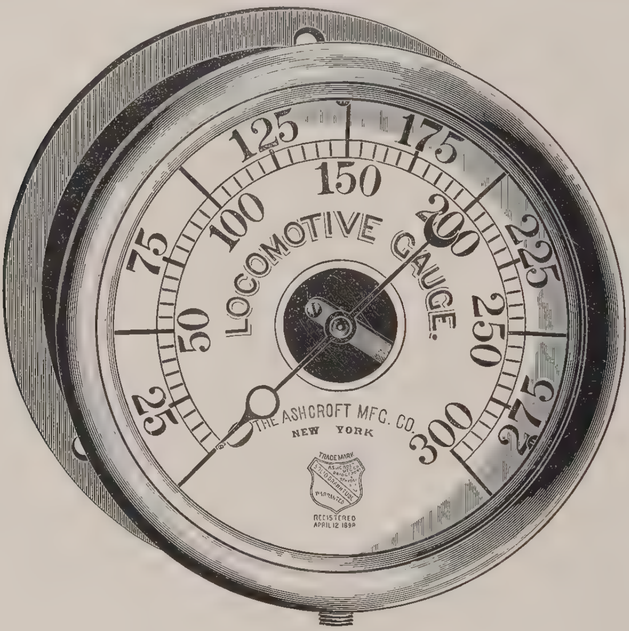


Fig. 313

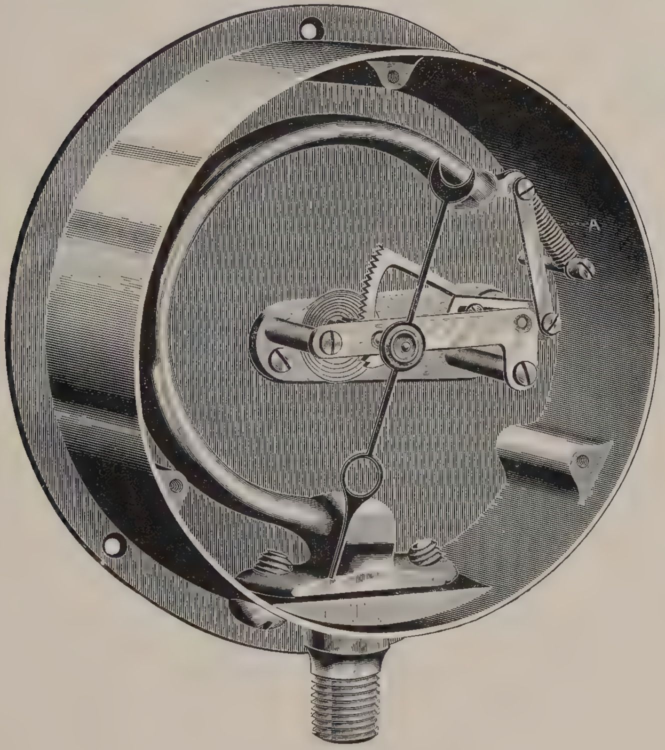
GENERAL DESCRIPTION

The special improved construction of this style of Gauge is the result of our efforts to provide an accurate, sensitive, and durable Gauge that would be exempt from the annoyance of *permanent set of springs* and the inaccuracies arising therefrom, which frequently occur in all Gauges of the Single or Double Bourdon Tube type, irrespective of the length or shape of their springs, the means employed for connecting them to their movements, or their cross-sectional shape, and the experience of our many customers in the long and continued use of these Auxiliary Spring Gauges has demonstrated that they are the most accurate and durable Pressure Gauges for any and all kinds of service that have ever been offered to the public.

The auxiliary spring feature of this Gauge consists of an independent co-operating spiral spring (see "A" in sectional view) applied to the free end of the single Bourdon tube, which enables us to dispense with the *second Bourdon Tube*, and to reduce the number of joints subjected to wear and friction between the tube and the segment of the recording movement to the *least possible number—two only.* The Bourdon Tube is short enough to drain itself, the Gauge is very quick to act, and will respond to the slightest change in pressure, either upward or downward. It is graduated by open mercury column, stamped with our trademark, and warranted correct.

For prices, see next page.

ASHCROFT
AUXILIARY SPRING LOCOMOTIVE GAUGES



Sectional View

Fig. 314

PRICES EACH

Including Cock and Coupling for Each Gauge, and Wooden Blocks to form air space back of Gauge

Size	Iron Case, Brass Ring	Iron Case, Nickeled Ring	Brass Case	Nickeled Case
6¾-inch Dial	$18.00	$18.60	$22.00	$24.00
6 “	15.00	15.50	18.00	19.50
5½ “	12.00	12.25	14.00	15.25
5 “	11.00	11.20	13.00	14.00
4½ “	10.00	10.20	12.00	13.00

A siphon must be used with these Gauges. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressures, should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT DOUBLE-SPRING LOCOMOTIVE GAUGES

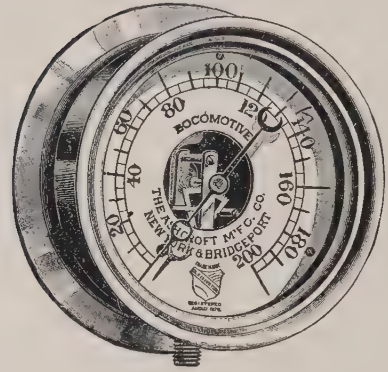
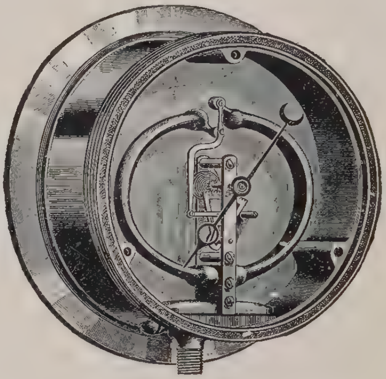


Fig. 315



Sectional View

Fig. 316

We also manufacture double Bourdon Tube Gauges for locomotive service. We can graduate these Gauges to any pressure up to 500 pounds per square inch.

GENERAL DESCRIPTION

These Gauges have non-corrosive movements. Springs are made from specially prepared, highly tempered, seamless drawn tubing. Movements and springs are removed from all contact with back of case. Elastic packing rings hermetically seal the gauge cases, making them impervious to moisture and dust. Figures on dial are cut large and deep, and filled with black enamel. Teeth in segments and pinions are cut on improved gear cutters. Face of segment is very broad and the teeth deep, thus preventing lost motion from wear. They are all stamped with our trademark and are warranted correct.

PRICES EACH

Including Cock and Coupling for Each Gauge, and Wooden Blocks to form air space back of Gauge.

Size	Iron Case, Brass Ring	Iron Case, Nickeled Ring	Brass Case	Nickeled Case
4½-inch Dial. . .	$10.00	$10.20	$12.00	$13.00
5 " . . .	11.00	11.20	13.00	14.00
5½ " . . .	12.00	12.25	14.00	15.25
6 " . . .	15.00	15.50	18.00	19.50
6¾ " . . .	18.00	18.60	22.00	24.00

A siphon must be used with these Gauges. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure to which you wish us to graduate the Gauges.

ASHCROFT STEAM HEAT GAUGES

For Service on Railroads

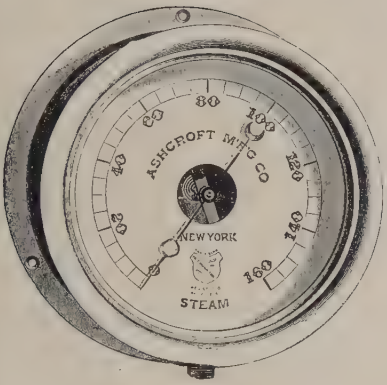
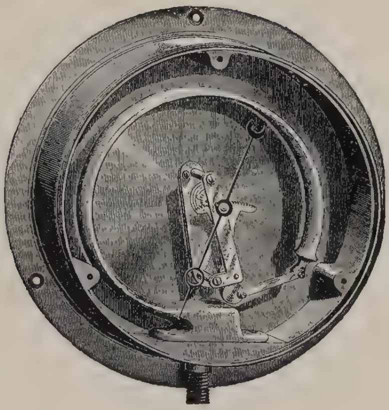


Fig. 317



Sectional View

Fig. 318

These Gauges are for use on the steam-heating service of locomotives and cars. They can be graduated to pressures as high as 300 pounds to the square inch. They are also used in the caboose to determine the air-brake pressure. The general construction is of our usual high standard. They are all graduated by open mercury column, stamped with our trademark, and are warranted correct.

PRICES EACH

Including Cock for Each Gauge

Size	Iron Case, Brass Ring	Brass Case	Nickeled Case
4½-inch Dial	$ 8.00	$10.00	$11.00
5 "	8.00	11.00	12.00
5½ "	10.00	12.00	13.25
6 "	13.00	16.00	17.50
6¾ "	16.00	20.00	22.00

A siphon must be used with these Gauges when used on steam pressures. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressure, should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT DUPLEX AIR-BRAKE GAUGES

Westinghouse Type

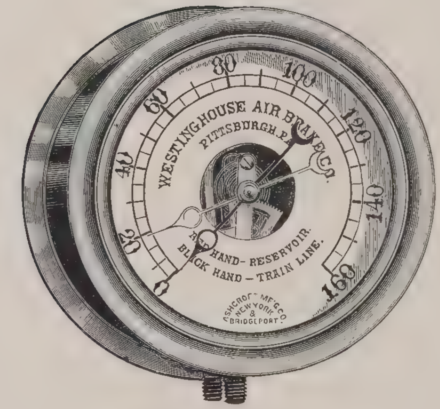
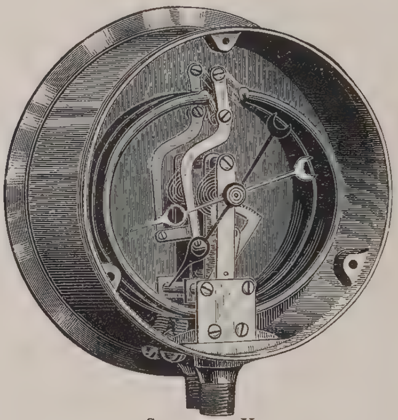


Fig. 319



Sectional View

Fig. 320

GENERAL DESCRIPTION

The above cuts illustrate an exterior and interior view of our Standard "Westinghouse" type Air-Brake Gauge, of which we are the sole manufacturers. We have manufactured and sold this Gauge for many years past, and it is especially constructed to withstand the severe usage to which it is subjected on a locomotive engine, for air brake pressure indications.

Its interior mechanism consists, in part, of two separate sets of Bourdon double-tube springs, which are independently connected to their recording movements, the train line pressure operating one set and the reservoir pressure operating the other. The springs are so connected to their movements as to permit the use of a single graduated scale on the dial for indicating the true pressure operating each set, a red-painted hand denoting the reservoir pressure, and a black hand the train-line pressure. The springs are our well-known, solid drawn, seamless tubing. The special movements are of our own manufacture, and every detail of the Gauge, including the workmanship and finish, receives special and careful attention.

PRICE

5½-inch Dial, Brass Deep Case	$20.00 each.

WESTINGHOUSE PATENT SEMAPHORE AIR-BRAKE GAUGES

With Duplex Auxiliary Springs

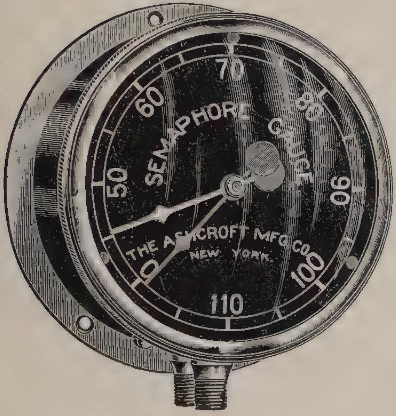
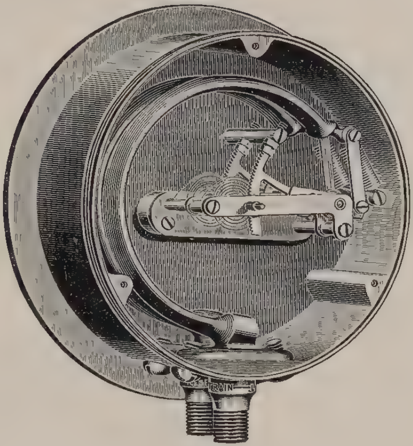


Fig. 321



Sectional View

Fig. 322

The above illustrations show a later style of Duplex Air-Brake Gauge made with the "Semaphore" features on the dial as designed by the Westinghouse Air-Brake Co. The Bourdon tubes used in this type of Duplex Gauge are our well-known auxiliary spring style made of solid drawn seamless brass tubing, and the same as are used in our Standard Locomotive Gauges, illustrated and described on pages 28 and 29.

The dial of this "Semaphore" Gauge is of special construction, being colored black, with the pressure graduations, figures, and lettering in white, the figures being so arranged that their positions for the three pressures of 50, 70, and 90 pounds per square inch, the most important pressures to the engineer for operating the air-brakes, enable him to instantly and accurately observe the variations of pressures in his air-brake system, as the two extreme pressures of 50 and 90 always stand at right angles with the 70 pound pressure point located at the top center of the dial. On this dial a much wider space is allowed for each 5 pounds pressure, so as to ensure a closer and more accurate reading of the pressure variations by a quick glance at the dial, than can be done on an ordinary graduated dial.

The pointers used on this Gauge are of a special design, with a semaphore target on their short ends. They are finished in different colors for readily distinguishing the reservoir pressure from the train line pressure. This Gauge has a face or dial of 5½-inch diameter.

Prices upon application.

ASHCROFT
FARM ENGINE AND PORTABLE ENGINE GAUGES

With Auxiliary Springs

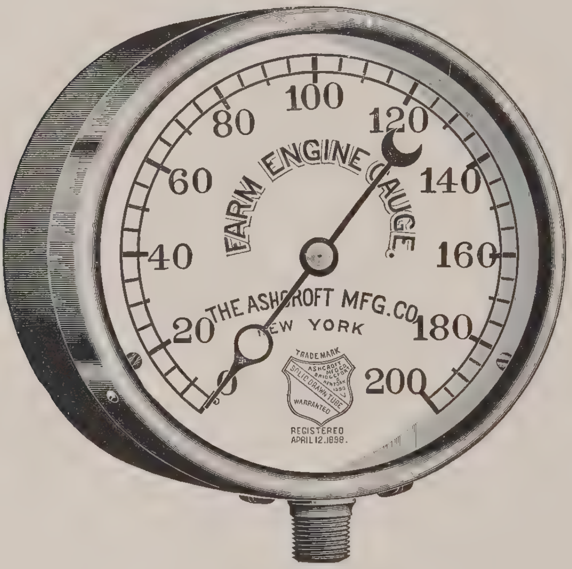


Fig. 323

We have always been the largest producers of Steam Gauges for traction and portable engine work, and these Gauges are the result of many years' experiments and experience in the manufacture of Gauges for this severe service.

On pages 36 and 37 we have published testimonials from many prominent users, and we call their attention to any one interested in this subject.

GENERAL DESCRIPTION

In interior construction these Gauges are made the same as the Gauges shown in figures Nos. 306 and 307, and described fully on pages 18 and 19. Connections are ¼-inch male pipe thread. Rings fit close and are held by screws. Back of case is without flange. Movements are non-corrosive Springs are made from carefully selected, seamless drawn tubing. Dials are made of brass and silvered, with the figures and letters cut deep and filled with black enamel. They are all stamped with our trademark and are warranted correct.

For prices, see next page.

ASHCROFT
FARM ENGINE AND PORTABLE ENGINE GAUGES

With Auxiliary Springs

OPTIONS

These Gauges can be furnished with black dials and silvered letters and figures, with customer's name and address cut in dials, and with ⅜-inch pipe thread connection, if so stated in order.

PRICES

Including Cock for Each Gauge

4½-inch Dial, Iron Case, Brass Ring	$8.00 each
5 " " " " " "	8.00 "
4½ " " " " Nickel "	8.20 "
5 " " " " " "	8.20 "

A siphon must be used with these Gauges to prevent anything but water entering the spring of the Gauge. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam Pressure, should be graduated to double their working pressure to ensure the greatest durability.

Read what prominent traction engine builders have to say about these Gauges on pages 36 and 37.

ASHCROFT
FARM ENGINE AND PORTABLE ENGINE GAUGES

With Auxiliary Springs

J. I. Case Threshing Machine Co.

RACINE, Wis., Dec. 3, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : We have your favor of November 30th, and in reply beg to say that we have used the Ashcroft Steam Gauges on our traction engines for the past several years, and beg to state that the same have proved entirely satisfactory and up to the high standard of goods demanded by this Company.

We have given the Steam Gauge question very careful and exhaustive tests, and find the Ashcroft Gauge to be the one best adapted to our high standard of work. Very respectfully,

(Signed) FREDERICK ROBINSON, V.P.

Advance Thresher Co.

BATTLE CREEK, Mich., Dec. 13, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : In reply to yours of recent date, asking for an expression as to what we think of the Steam Gauges that you especially make for the traction engine trade, we are pleased to say that the Gauge meets all of our requirements. It is a great improvement over what was used for this particular purpose some years since. In fact, until you brought out this Gauge, we were unable to find one that was fully adapted to traction engines.

We cheerfully offer this as a testimonial.

Yours very truly,

ADVANCE THRESHER CO.

Frick Company

WAYNESBORO, Pa., Dec. 8, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : We have been using your Steam Gauges on our traction engines and portable engines for a number of years, with very satisfactory results. We rarely have a Gauge returned for repairs or adjustment, and, in fact, during the past year or two we do not recall a single instance of complaint. We are very well pleased with the Gauges, and do not hesitate to recommend them. Yours truly,

(Signed) EZRA FRICK, Gen. Mgr. and Sec'y.

ASHCROFT
FARM ENGINE AND PORTABLE ENGINE GAUGES

With Auxiliary Springs

A. W. Stevens Company

MARINETTE, Wis., Dec. 15, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: The Steam Gauges made by your company have been for years exclusively used on the Stevens engines, with the best of results.

We presume all makers of engines have had the same experience and trouble as ourselves—viz., to find a reliable steam gauge—one which would withstand successfully the severe usage to which they are subjected on traction engine work. Anyway, we are free to confess to having had great difficulty to get a satisfactory Gauge until we began to use, some years ago, the "Ashcroft." We know this Gauge to be all right and reliable, as are the people who make them. Yours truly,

(Signed) LEROY W. STEVENS, Gen. Mgr.

Port Huron Engine and Thresher Co.

PORT HURON, Mich., Dec. 13, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: Enclosed we hand you order for 215 Steam Gauges. Please hurry the shipment, as we are entirely out of these, and need them quite badly.

We have been using your Gauges on our traction engines for a good many years, and the result is very satisfactory to ourselves and to our customers. The traction engine is a very hard place for a steam gauge. They are subject to all kinds of weather and all kinds of treatment; but your Gauges have stood the test very satisfactorily, and so far we have found none that can beat them. Yours truly,

PORT HURON ENGINE & THRESHER CO.

Sawyer & Massey Co., Limited

THE ASHCROFT MANUFACTURING CO.
NEW YORK

HAMILTON, Ont., Dec. 8, 1898.

Gentlemen: We have been using your Auxiliary Spring Gauges on our traction engines for the past two years, and have found them first-class in every respect. They have given better satisfaction than any others we have used. Yours truly,

SAWYER & MASSEY CO., Limited.

ASHCROFT AMMONIA GAUGES

With Steel Springs

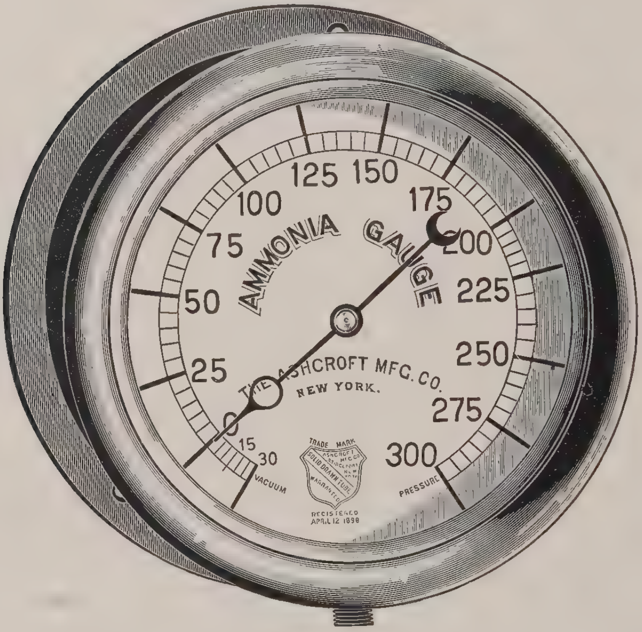


Fig. 324

These Gauges are adapted for use with ammonia and all other fluids and gases that affect brass.

GENERAL DESCRIPTION

These Gauges have non-corrosive movements specially prepared to withstand the oxidizing action of ammonia gases. Springs are made from solid bar steel, carefully bored out, bent, tempered, and tested. Dials are silvered, with the figures and letters cut deep and filled with black enamel. Connections are ¼-inch male pipe thread at bottom of Gauge, as shown in cut. They are all graduated by open mercury column, are stamped with our trade-mark, and are warranted correct.

OPTIONS

These Gauges can be furnished with black dials and silvered letters and figures, with connection at back of case, with customer's name and address cut in dials, if so stated in order.

For prices, see next page.

ASHCROFT AMMONIA GAUGES

With Steel Springs

PRICES EACH

Size	Iron Case and Ring	Iron Case, Nickeled Ring
8½-inch Dial	$45.00	$45.75
6¾ "	40.00	40.60
6 "	35.00	35.50
5½ "	30.00	30.50
5 "	30.00	30.50
4½ "	25.00	25.50
3½ "	25.00	25.50

Prices on Iron Cocks for use with Ammonia Gauges will be given on application.

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressure, should be graduated to double their working pressure to ensure the greatest durability.

If a double scale, showing both pressure and vacuum, is required, as shown in cut, do not fail to so state in order.

For description of Recording Gauges for ammonia, see pages 56 and 57.

ASHCROFT HYDRAULIC GAUGES

With Steel Springs

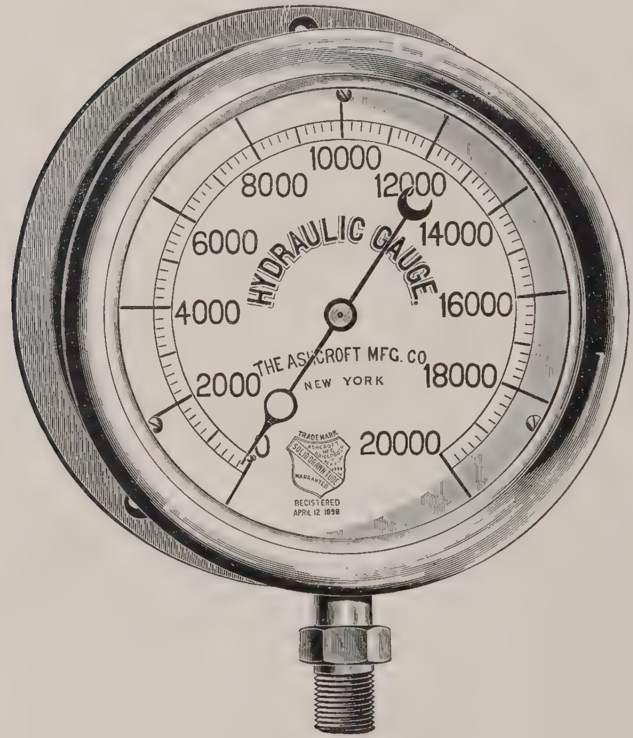


Fig. 325

These Gauges can be graduated to any pressure not exceeding 20,000 pounds per square inch and are used mostly on Hydraulic Presses.

GENERAL DESCRIPTION

These Gauges have non-corrosive movements. Springs are made from solid bar steel, carefully bored out, bent to shape, tempered, and tested. The dials are of silver finished metal, with the figures and letters cut deep, and filled with black enamel. Connections are ½-inch male pipe thread at bottom of Gauge, as shown in cut. The Hexagon nut on the socket is provided for the use of a wrench when securing the Gauge in place.

OPTIONS

These Gauges can be furnished with black dials and silvered letters and figures, with customer's name and address cut in dials, if so stated in order.

For prices, see next page.

ASHCROFT HYDRAULIC GAUGES

With Steel Springs

PRICES EACH

Size	Iron Case, Brass Ring	Iron Case, Nickeled Ring	Brass Case	Nickeled Case
12-inch Dial.	$110.00	$111.50	$125.00	$129.00
10 "	90.00	91.00	100.00	103.00
8½ "	70.00	70.75	80.00	82.50
6¾ "	50.00	50.60	60.00	62.00
6 "	35.00	35.50	40.00	41.50
5 "	30.00	30.50	35.00	36.00
4½ "	25.00	25.50	30.00	31.00
3½ "	22.00	22.50	26.00	26.75

Maximum hand, $5.00 extra.

Special prices on Hydraulic Gauges with brass springs, graduated to not over 1,000 pounds, will be given on application.

We strongly recommend the use of a check valve with every Hydraulic Gauge. (For description and price of check valve, see page 42.)

For description and price of cocks for use with Hydraulic Gauges, see page 42.

A maximum hand can be attached to these Gauges to show at any time the highest pressure to which the Gauge has been subjected.

These Gauges can be graduated to show corresponding pressure in tons on any given sized ram, without extra charge.

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges should be graduated to double their working pressure to ensure the greatest durability.

If a double scale showing pounds pressure per square inch and tons on ram is required, state the diameter of the ram and the number of tons to which we shall graduate the Gauges.

ASHCROFT HYDRAULIC COCKS

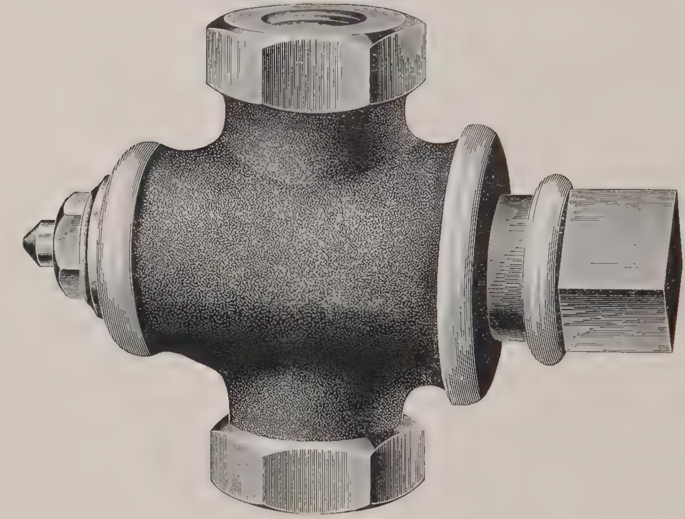


Fig. 326

The square end of the plug of this cock is for the use of a wrench to open and close it.

Price, $8.00 each

ASHCROFT HYDRAULIC CHECK VALVES

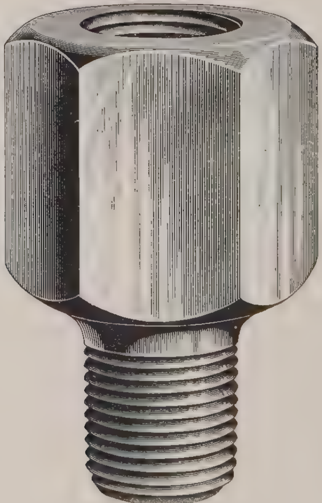


Fig. 327

In the general use of Hydraulic Gauges the pressure is exhausted so suddenly as to cause a severe shock to their interior springs, which soon weakens them, besides injuring the other working parts of the Gauges. To prevent the injurious effects of such shocks and allow of a more gradual exhausting of the pressure, we recommend with every Hydraulic Gauge the use of these special check valves.

Price, $2.50 each

ASHCROFT MERCURY GAUGES

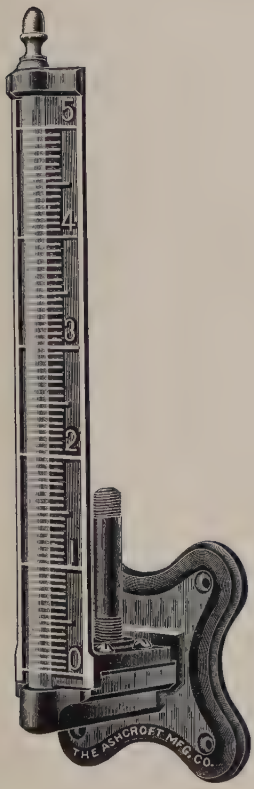


Fig. 328

We make these Gauges for both 5 and 10 pounds pressure, and they are used mostly on gas pressures, but are adapted for many other low-pressure uses. Before connecting this Gauge pour into the connecting nipple sufficient mercury to have it appear in the glass tube at the zero graduation on the scale.

PRICES

Mercury Gauge, scaled to 5 pounds	$5.00 each
" " " " 10 "	8.00 "

ASHCROFT

PRESSURE GAUGES FOR NATURAL GAS

With Steel Springs

Many users of Pressure Gauges on natural gas pressures have found that gauges with steel springs will last much longer, and prove in the end more economical than others for this class of work.

Special prices and information regarding these Gauges will be given on application.

ASHCROFT SELF-TESTING GAUGES

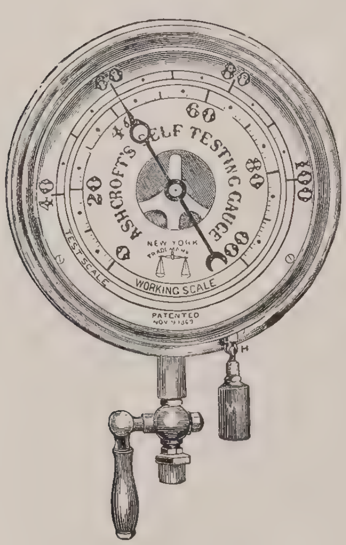
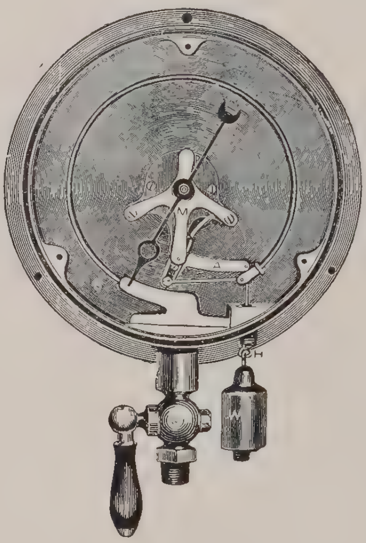


Fig. 329



Sectional View
Fig. 330

This Gauge has two sets of graduations on the dial. The outer is for the working scale, and the inner for the testing scale. This is a valuable invention, permitting the user to at any moment quickly prove the accuracy of his Gauge without removing it from its position.

To Test.—Unscrew the small weight at top, also cap from bottom, and hang weight on hook. If, on testing, the indicating hand is brought back to the point that it showed pressure on working graduation, the Gauge is correct.

PRICES

Including Cock for Each Gauge, as Shown

	EACH
10 inch dial, Brass Case	$60.00
8½ " " "	48.00
6¾ " " "	36.00
6 " " "	30.00
5½ " " "	26.00

A siphon must be used with these Gauges when used on steam pressures. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauges graduated. All Pressure Gauges, particularly when used under steam pressure, should be graduated to double their working pressure to ensure the greatest durability.

ASHCROFT STEAMBOAT CRANK INDEXES

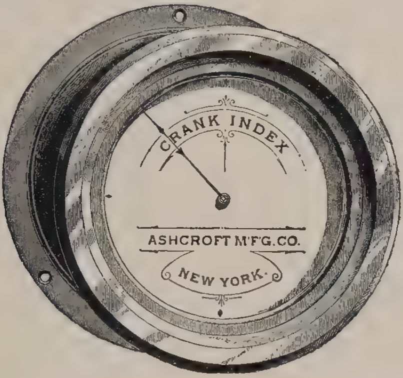


Fig. 331

This instrument is intended to be placed in an engine room, from which the crank or cross-head is not visible, to guide the engineer when using the starting-bar.

PRICES

12-inch Dial, Brass Deep Case	$75.00 each
10 " " " " "	60.00 "
8½" " " " "	50.00 "

ASHCROFT RECORDING PRESSURE-GAUGES

This special Gauge in general appearance matches the Gauge shown on pages 12 and 13, and has, in addition, two extra hands or pointers, one for showing the highest pressure to which the Gauge has been subjected, and the other the number of times any certain pressure has been exceeded. The position of the recording hands cannot be changed without opening the Gauge Case, which can be secured by padlock and key when desired.

PRICES

Including Cock for Each Gauge

8½-inch Dial, Brass Case	$38.00 each
6¾ " " " "	30.00 "

Padlocks extra, at cost

ASHCROFT TEST GAUGES

With Single Bourdon Springs

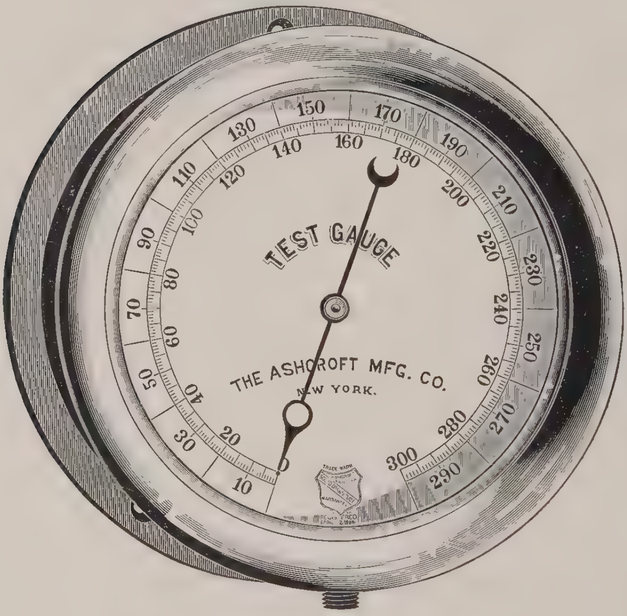


Fig. 332

All of our Test Gauges are graduated and adjusted with the utmost care and precision by our open mercury column, and all users of Pressure Gauges will find a Test Guage of material service to them in determining what errors, if any, exist in their Gauges. The interior mechanism of these Gauges is of fine and delicate workmanship. The Gauge hand is made sufficiently delicate to indicate the slightest change in pressure, and the graduations of the dials are made for as close reading as their varied sizes will permit. The dials of all these Gauges are stamped with our trademark, and they are warranted correct.

For prices, see next page.

ASHCROFT TEST GAUGES

With Single Bourdon Springs

PRICES EACH

Including Cock for Each Gauge

Size	Brass Case	Nickeled Case
10 - inch Dial	$50.00	$53.00
8½ "	40.00	42 50
6¾ "	30.00	32.00
6 "	25.00	26.50
5½ "	20.00	21.25
4½ "	16.00	17.00
3½ "	14 00	14 75
3 "	14.00	14.60

A siphon must be used with these Gauges when used on steam pressures to prevent anything but water entering the spring of the Gauge. (For prices of siphons, see page 75.)

When ordering, do not fail to state the pressure per square inch to which you wish the Gauge graduated. Test Gauges should be graduated to about 25 per cent. beyond their highest working pressure to ensure the greatest durability.

These Gauges cannot be graduated to more than 1,000 pounds; for higher pressure, prices will be given on application.

For description and prices on Test Pumps for use with Test Gauges, see pages 82, 83, and 84

ASHCROFT INSPECTORS' TEST GAUGES

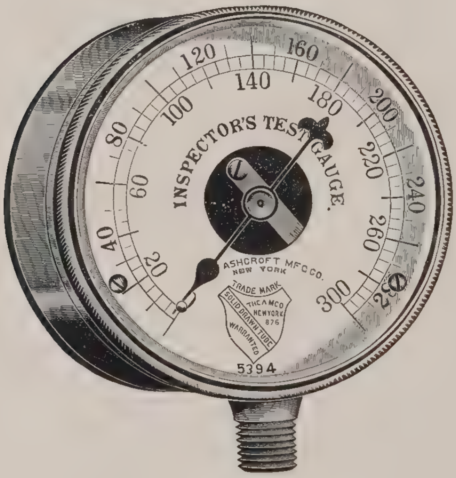


Fig. 333

This Gauge was designed more particularly to meet the requirements of Steam Boiler Inspectors, and is made as light as possible for convenience in carrying. The screw ring is fitted with bevel glass, and the genera construction of the Gauge is the same as those described on pages 46 and 47.

PRICE

3-inch Dial, Nickeled Brass Case, with small Nickeled Union Cock.	Each, $14.60

For prices on Test Pumps for use with this Gauge, see page 82.

ASHCROFT PRESSURE OR VACUUM GAUGES WITH SUN DIALS

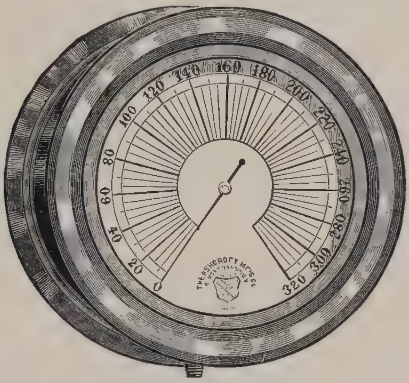


Fig. 334

This cut shows what we term as a Sun Dial, which can be furnished on any of the different styles of Gauges shown in this catalogue, the principle being to extend the pressure graduations on the dial nearer the center, and by using the short hand reduce the motion of the pointer to a minimum.

ASHCROFT GAUGE HAND PULLERS

No. 1

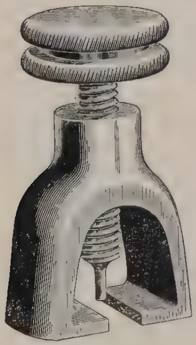


Fig. 335

No. 2

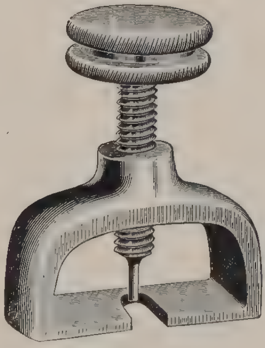


Fig. 336

These Hand Pullers will be found very convenient in quickly and easily removing the hands from Gauges.

PRICES

Hand Puller No. 1, for all Guages up to 8½ inches	$1.50 each
" " 2, " larger sizes	3.00 "

EDSON
PRESSURE-RECORDING AND ALARM-GAUGES

These Gauges are well known throughout the world, and for over twenty-five years have been extensively used on all classes of work, as is evidenced by the variety of testimonials published in relation to them. The different styles are adapted for *Steam*, *Air*, *Gas*, *Water*, *Ammonia*, *and any fluid pressure*, and as a source of economy we recommend their use to any one desiring an infallible record of pressures carried by day and night.

They are largely used by Pipe Lines, Waterworks, Gas Companies, Breweries, Bleacheries, Cotton Mills, Electric Light and Power Companies, Paper Makers, Sugar Refineries, and in the steam plants of Steel Makers, Hotels, Office Buildings, Ice Manufacturers, and steam users in general. The records obtained for each twenty-four hours should be filed away daily for future reference as a record of pressures carried at any time, and the use of these Gauges in connection with an intelligent engineer will ensure steady steam, proportionate economy in coal consumption, and a record of pressures that will often prove an arbitrator in disputes.

We make them for pressures up to 1,500 pounds to the square inch, and also for vacuum as well.

Consolidated Gas Company of New York

April 30, 1896.

The Ashcroft Manufacturing Co.
New York

Gentlemen: We have now in use at the several stations of the Consolidated Gas Company in this city about a dozen of the Edson Recording- and Alarm-Gauges.

I was, as you no doubt remember, very skeptical as to their utility in our particular case, and changed my opinion only after long and careful trial. I consider them to be an indispensable adjunct to a well-appointed and carefully managed steam plant, and should be unwilling to discard them. They are well adapted for the purpose intended, durable, and do their work perfectly, being ornamental in design and not unsightly in an office. It is a safeguard, and also is in the interest of economy in working to have a record open to inspection at any moment, showing at a glance the condition of the plant during the entire twenty-four hours, and whether those in charge are faithful in the performance of their allotted duties.

Yours truly,

(Signed) W. H. Bradley, Chief Engineer.

EDSON PRESSURE-RECORDING AND ALARM-GAUGES

Style No. 1

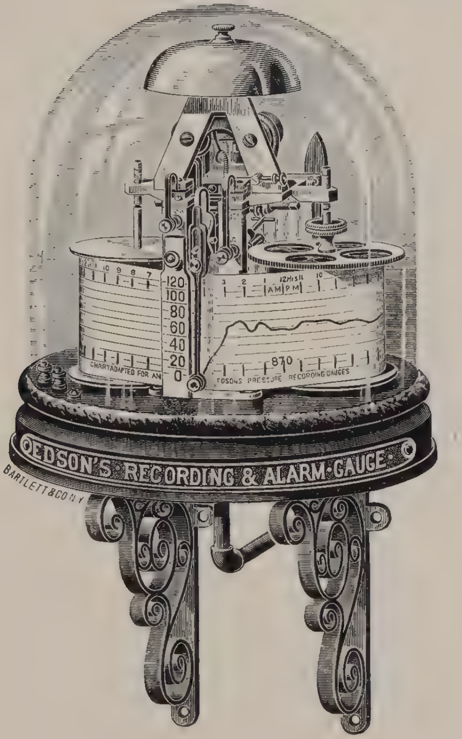

120
100
80
60
40
20
0
AM PM
CHART ADAPTED FOR AN
EDSON'S PRESSURE RECORDING GAUGES
EDSON'S RECORDING & ALARM GAUGE
BARTLETT & CO N.Y.

Fig. 337

PRICE, $85.00 EACH

This style Gauge can be used on steam, air, gas, water, and all fluid pressures excepting ammonia.

Style No. 1 is provided with electric bell for sounding the alarm when a certain high pressure is reached. If so ordered, this style can be furnished with electric bell for low pressure *only*. For $5.00 net extra this style can be furnished with bell for both high and low pressures.

Price includes one year's supply of charts, numbered consecutively for each day in the year, and ruled to the special scale of the instrument ; one special album for filing away charts daily as records are made upon them; one lot of shelf and brackets.

These recorders have a chart speed one-half inch per hour, which can be made one inch per hour, if stated in the order.

In ordering, always state the working pressure, and whether high and low alarms are required.

These Gauges can also be furnished to record vacuums. (Full details and prices on application.)

EDSON PRESSURE-RECORDING AND ALARM-GAUGES

H. DeC. Richards
Constructing Engineer and Contractor
Railroads and Waterworks

New York, January 16, 1899.

The Ashcroft Manufacturing Co.
New York

Gentlemen: I have your inquiry as to my opinion of the Recording Gauges you manufacture and the advantages of using such.

In my opinion, Recording Gauges are a dire necessity on any waterworks plant. I would not operate a steam plant of any kind without a Recording Gauge. A Recording Gauge chart and a coal record for each day means steady steam pressure, resulting in economy of fuel and lessened repairs to both furnaces and boilers.

A Recording Gauge is the only means I know of to protect a water company against unscrupulous city councils. Every water plant, public or private, should have a Recording Gauge on its steam line and another on its water main.

The Recording Gauge not only protects the superintendent against unfair claims of "no pressure," but it enables him to figure out when the pressure goes off, and to what extent; when pumps are shut down and started. I have not yet found an employee sharp enough to beat your Gauge on a water works, electric, or mining plant.

With electrical connection and alarm, a manager of a hydraulic mining plant is protected as he cannot be in any other way.

I have not found any other Recording Gauge as satisfactory as the Edson, and prefer to pay the additional cost for superior service. I always install the Edson when I am left to my own judgment.

Yours very truly,
(Signed) H. DeC. Richards.

Superintendent Darling, of the Pawtucket, R. I., Waterworks, in his report, dated December, 1889, says: "No well-conducted waterworks can afford to be without Recording Gauges, and, when properly located, they will, in my opinion, pay for themselves within one year." The Pawtucket Waterworks employ eight Edson Recorders, seven attached to their water mains at different parts of the city, and one attached to the steam boilers.

The general adoption of the Edson Pressure-Recording Gauge is owing, among other things, to its established reputation for doing all that is claimed for it, its longevity, its simplicity of construction, and its *well-known reliability*, the Edson Recorder having many years ago received its title for "maintained superiority." In this way it has become the only recognized standard Time- and Pressure-Recording Gauge, performing all its functions in a thoroughly satisfactory manner, the records of which have been taken in court as positive evidence of the pressure carried.

EDSON PRESSURE-RECORDING AND ALARM-GAUGES

Style No. 2

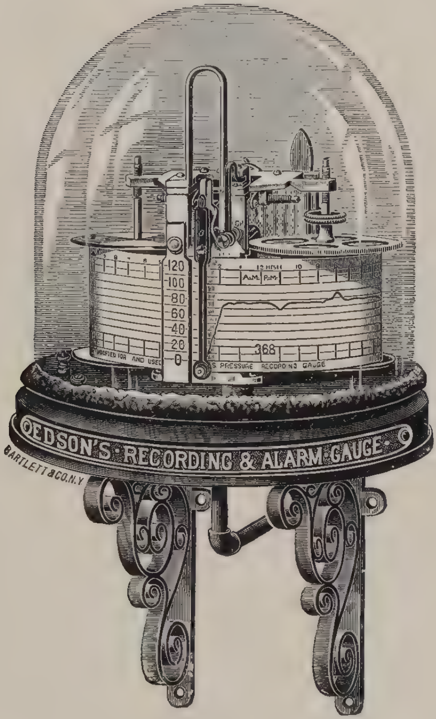


Fig. 338

Price, $80.00 each

This style can be used on steam, air, gas, water, and any fluid pressures, excepting ammonia.

Style No. 2 is arranged to ring an electric bell *placed at a distance* (5 miles if necessary) when a certain high pressure is reached. If so ordered, this style can be arranged to ring an electric bell for low pressure *only*. For $5.00 net extra this style can be arranged to ring bell at both high and low pressures.

Price includes one year's supply of charts, numbered consecutively for each day in the year, and ruled to the special scale of the instrument; one special album for filing away charts daily as records are made upon them; one lot of shelf and brackets.

These Recorders have a chart speed one-half inch per hour, which can be made one inch per hour if stated in the order.

In ordering, always state the working pressure, and whether high and low alarms are required.

These Gauges can also be furnished to record vacuums. (Full details and prices on application.)

EDSON PRESSURE-RECORDING AND ALARM-GAUGES

National Transit Company

New York, January 17, 1899.

The Ashcroft Manufacturing Co.
New York

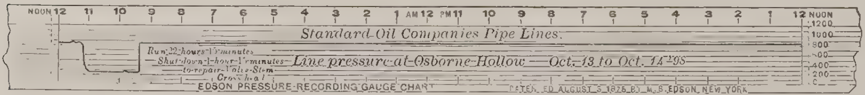
Dear Sirs: Replying to your favor of December 29, will say that it gives me great pleasure to state that I have in use on the Pipe Line Systems under my supervision about 140 of the Edson Recording Gauges, both for showing steam pressure and oil line pressures on our oil lines. The greater portion of these Gauges have been in use for the last 15 years, and have given entire satisfaction. They not only give us a correct record of the steam and oil pressure, but they also make a saving in fuel, owing to the fact that our steam pressure is carried at a more regular pressure than it would be otherwise without the Gauge

I call your attention to a chart taken from one of these Gauges in use at Osborne Hollow, enclosed herewith.* You will note what an even pressure was maintained for 22 hours and 15 minutes. A memorandum is given on this chart, showing that pumping ceased at 9.15 A.M. for 1 hour and 45 minutes.

Very truly yours,

(Signed) J. H. Snow, Gen'l Supt.

* Reduced facsimile of chart referred to.



Kalamazoo Paper Co.

Kalamazoo, Mich., October 4, 1897.

The Ashcroft Manufacturing Co.
New York

Dear Sirs: In reply to yours of the 30th, we do not need any introduction to the Edson Gauge, as we have had one for over ten years, and it is, as you say, a great steam pressure steadier.

Yours,

Kalamazoo Paper Co.

Keasbey & Mattison Company

Ambler, Pa., October 9, 1897.

The Ashcroft Manufacturing Co.
New York

Dear Sirs: We note your letter of October 5, regarding the Edson Pressure-Recording and Alarm-Gauge, and beg to say that we have had one for some time, and find it very satisfactory.

Yours truly,

(Signed) Thomas Rose Superintendent.

EDSON PRESSURE-RECORDING GAUGES

Style No. 3

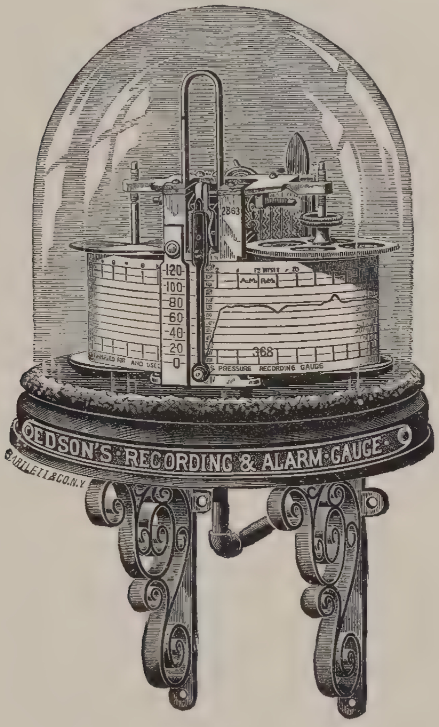


Fig. 339

PRICE, $75.00 EACH

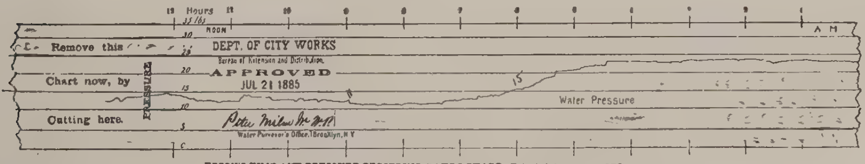
This style can be used on steam, air, gas, water, and any fluid pressures, excepting ammonia.

Style No. 3 has no alarm.

Price includes one year's supply of charts, numbered consecutively for each day in the year, and ruled to the special scale of the instrument; one special album for filing away charts daily as records are made upon them; one lot of shelves and brackets.

These Recorders have a chart speed one-half inch per hour, which can be made one inch per hour if stated in the order.

In ordering, always state the working pressure.



Reduced facsimile of Edson Charts
(Horizontal lines denote pounds pressure, and vertical lines the hours)

These Gauges can also be furnished to record vacuums. (Full details and prices on application)

EDSON AMMONIA PRESSURE-RECORDING GAUGES

The De La Vergne Refrigerating Machine Co.

To Whom It May Concern: New York, October 13, 1896.

We have examined the Ammonia Pressure Recording Gauges manufactured by the Ashcroft Manufacturing Co., of this city. Their construction is such that we consider them absolutely safe, but, besides this, we have the assurance of the manufacturers that each Gauge is tested, to a pressure of 500 pounds per square inch, before it leaves their works. The careful attention given to detail in the manufacture of the Gauges, coupled with the many years' experience of the makers in the manufacture of Recording Gauges, enables us to endorse them for accuracy and reliability.

The Gauges enable the owner of a refrigerating or ice-making machine to keep his machine and plant thoroughly in hand. He controls his plant night and day, because the Gauges furnish him correct records for every hour of the twenty-four.

It can easily be seen whether the plant has always been working under the condition prescribed by the owner; that is, whether a stated suction or back pressure has been maintained, and whether the condensing pressure has been uniform. It can easily be seen whether water in sufficient quantity has been applied to the condensers, and, if not, it will show when irregularities took place.

The Gauges will also indicate whether the machine was stopped and exactly at what hour of the day or night this occurred; they will tell whether the machine was stopped accidentally or purposely, and it is possible, within certain limits, to ascertain the cause of such stoppage. In short, any unusual occurrence, as well as the regular running of the machine and plant, is correctly traced upon paper slips, which furnish excellent records for reference. The advantages of keeping such records are so manifold that we are glad to hear efforts are being made to introduce these Guages more generally among users of refrigerating and ice-making machines.

(Signed) Louis Block, Chief Engineer.

Diamond Ice Company

The Ashcroft Manufacturing Co.
New York Wilmington, Del., May 28, 1891.

Dear Sirs: Without solicitation from you, I write to say that we are perfectly delighted with the (ammonia) Recorders you sent us. They not only afford us satisfaction, in providing a positive record of pressures, but to our surprise the effect upon the man who regulates the expansion valves in our factory is most remarkable. The valves are now adjusted with great accuracy, so that the pressure day and night is virtually the same, thus securing great economy in our work.

We are obliged to confess that what we regarded as a luxury when we purchased the Recording Gauges, we now find to be a necessity to every well managed ice manufactory.

Very truly yours,
(Signed) E. T. Warner, Vice-President.

EDSON AMMONIA PRESSURE-RECORDING GAUGES

Price includes one year's supply of charts, numbered consecutively for each day in the year and ruled to the special scale of the instrument; one special album for filing away charts daily as records are made upon them; one lot of shelf and brackets.

These Recorders have a chart speed one-half inch per hour, which can be made one inch per hour if stated in the order.

In ordering, state whether the Gauge is to be used for high or low ammonia pressure.

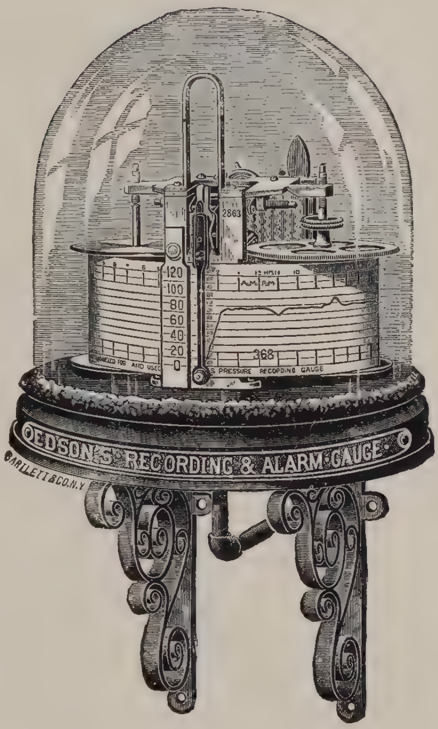


Fig. 340

PRICE, $100.00 EACH

Endorsed and highly recommended by The De La Vergne Refrigerating Machine Co., York Manufacturing Co., Frick Co., and American Ice Machine Co., as being indispensable in enabling the owner or superintendent of an ice or refrigerating plant to keep the same properly in hand, and giving him thorough control over it.

We refer to the following patrons as to their great value from an economical as well as a monitorial standpoint:

Lion Brewery	New York
Jacob Ruppert's Brewery	New York
A. Hupfel's Sons	New York
Consumers' Brewing Co.	New York
Long Island Brewery	Brooklyn, N. Y.
Wm J. Lemp	St. Louis, Mo.
Wm Peter Brewing Co.	Weehawken, N. J.
Diamond Ice Co.	Wilmington, Del.
Fred. Miller Brewing Co.	Milwaukee, Wis.
T. M. Sinclair & Co.	Cedar Rapids, Ia.
The J. & P. Baltz Brewing Co.	Philadelphia, Pa.
Bartholomay Brewing Co.	Rochester, N. Y.
East St. Louis Ice and Cold Storage Co.	St. Louis, Mo.

ASHCROFT TIME- AND PRESSURE-RECORDING GAUGES

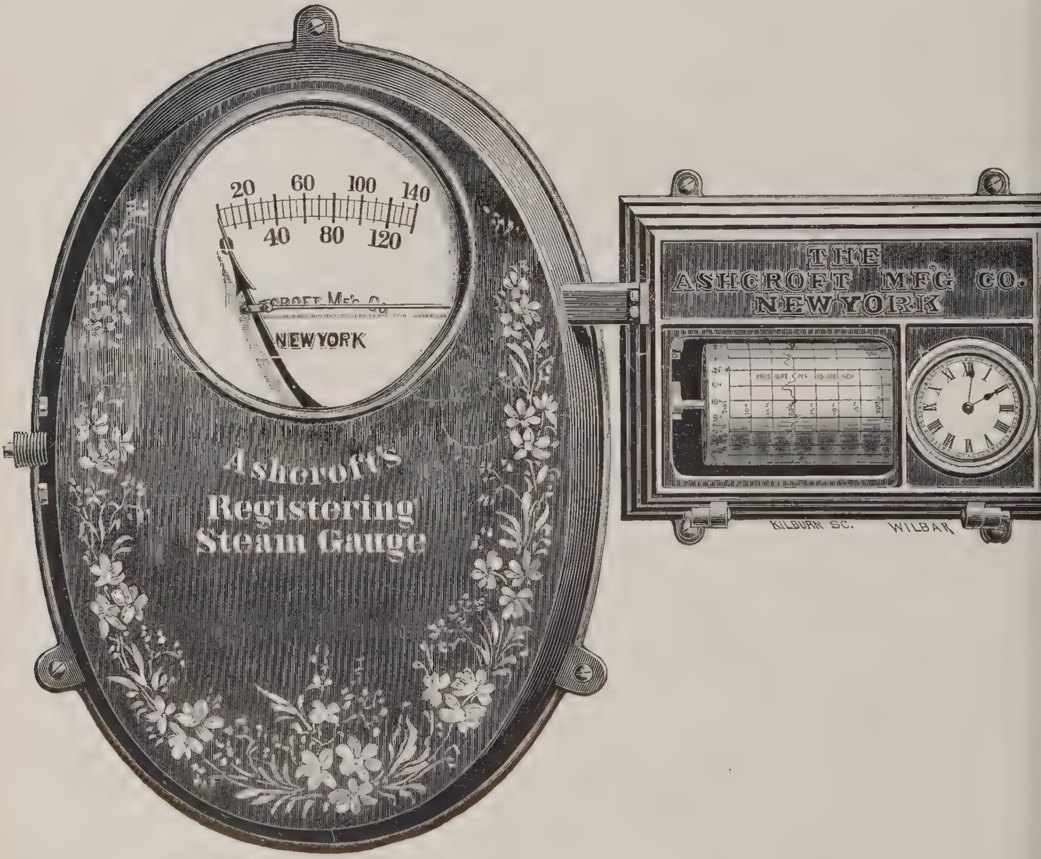


Fig 341

This Gauge, which is mounted on a black walnut or oak board, is designed for use on steam, air, gas, water, or any fluid pressure that will not affect the brass spring used in the Gauge.

For prices and description, see opposite page.

ASHCROFT TIME- AND PRESSURE-RECORDING GAUGES

GENERAL DESCRIPTION

These Gauges are generally graduated to a pressure of 160 pounds to the square inch, and the movements are non-corrosive, and the springs are made from carefully selected, seamless drawn tubing. Connected to the operating hand of the Gauge is the recording pencil, which bears on top of the paper roll as it is revolved by the clock movement. This clock movement is of the E. Howard Watch and Clock Company's best make, full jeweled, and has chronometer balance.

PRICE

Complete with one year's supply of dials	$100.00 each

This Gauge can be located in the engine or boiler room, office, or elsewhere, and the records obtained should be filed away so that they can be referred to at any time. These records will show the variations in pressure at any time of day or night.

The entire apparatus is a valuable ornament to any office or engine room.

When ordering, do not fail to state your working pressure, so as we can graduate the Gauge to a pressure that will best ensure long continued service.

HORIZONTAL

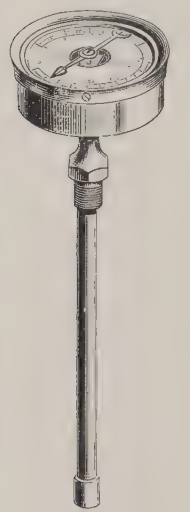


Fig. 342

ASHCROFT PYROMETERS

For Bakers' Ovens, Oil and Tar Stills,
Drying and Japan Ovens, Boiler
Flues, Chimneys, etc.

PRICES

Brass case, 6-inch dial, each	$30.00
Iron " 6 " "	25.00

VERTICAL

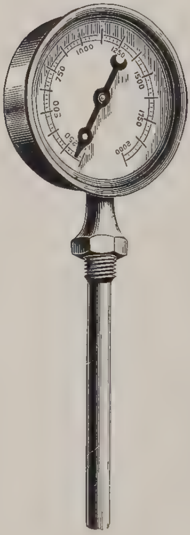


Fig. 343

These Pyrometers have ¾-inch pipe connections, and are made with an iron tube outside and graphite stem inside, and we can furnish them for temperatures up to 2,000° Fahr. *Unless specially made, the entire length of stem should be inserted in the heat.*

Each Pyrometer is carefully graduated to a standard. They are in general use for all manufacturing operations where a durable and reliable indicator of heat is required.

The metal of the expansion stem, also the length of the same, is varied, to adapt the Pyrometer to all situations. For bakers' and Japan ovens the Pyrometer is screwed into a cast-iron box plate, set in the side or front wall of the oven.

In oil and tar stills the Pyrometer may be inserted in end, side, or top.

In ordering, please state :

1st. For what purpose desired.
2d. Height of temperature required.
3d. Length of stem.
4th. What style, horizontal or vertical.

These Pyrometers are quick in action, and will immediately show change in temperature; other makes are sluggish in their action, as they depend upon the expansion and contraction of an iron and brass tube.

ASHCROFT REVOLUTION COUNTERS

With Square Cases

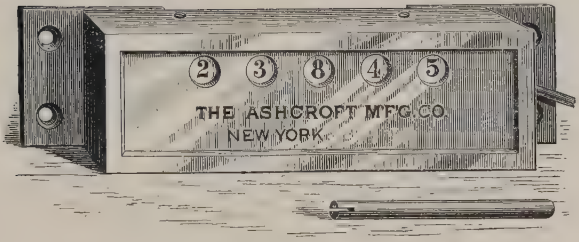


Fig. 344

These Counters are constructed without springs, are perfect in action and durable, and are cheaper in price than those shown on page 62. They are operated by the lever at the right-hand side and have a positive motion.

They should be connected in the same position as shown in cut, with the lever on a dead center to the rod that can be fastened to operate it.

PRICES EACH

Size	Figures	Counting	Plain	Resetting
4½ in. x 1¾ in.	4	10,000	$13.50	$17.50
5 " x 1¾ "	5	100,000	16.00	20.00
5½ " x 1¾ "	6	1,000,000	20.00	24.00
6 " x 1¾ "	7	10,000,000	24.00	28.00
7 " x 2½ "	4	10,000	20.00	24.00
8 " x 2½ "	5	100,000	24.00	28.00
9 " x 2½ "	6	1,000,000	28.00	32.00
10 " x 2½ "	7	10,000,000	32.00	36.00

ASHCROFT REVOLUTION COUNTERS

With Round Cases

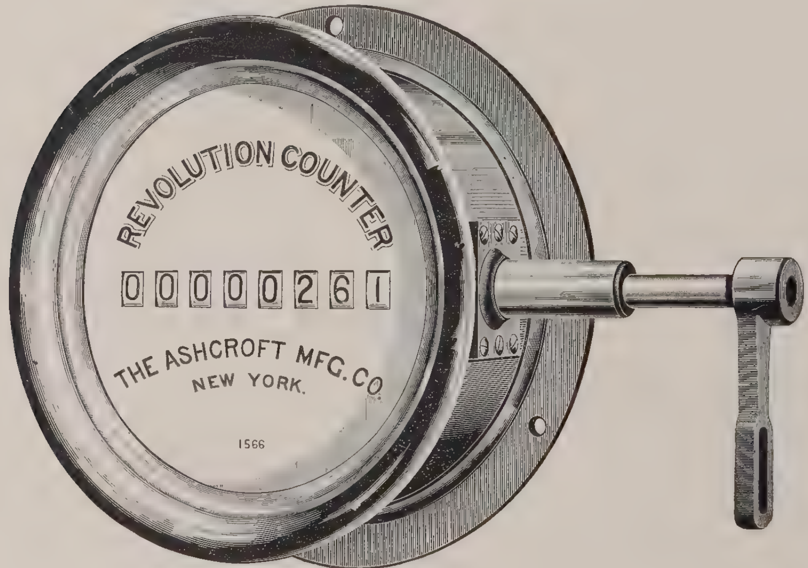


Fig. 345

These Counters are used largely on marine engines, in pumping stations, or wherever a record of revolutions is desired.

GENERAL DESCRIPTION

The construction of this Counter is such that either a reciprocating or continuous movement of the crank-shaft will transmit a positive rotating motion to the decimal wheels. This is accomplished through the medium of the verge movement, which consists of a verge wheel rigidly attached to the initial decimal wheel; a sliding plate placed transversely to such verge wheel.

The rings are connected to the cases by strong, substantial, and mechanically fitted hinges; cases are equipped with lock and key, and the whole interior mechanism is of our latest and best production.

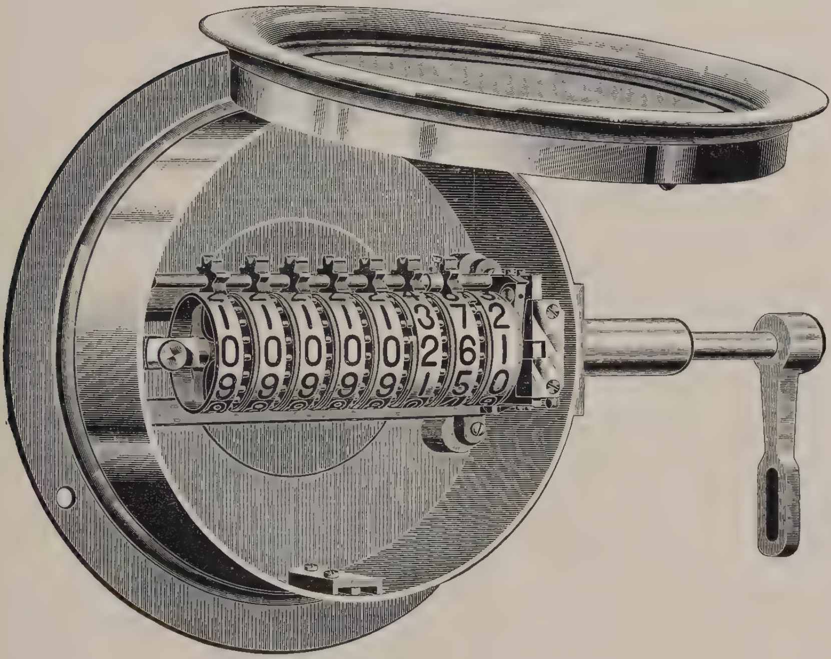
These instruments are driven from their right-hand side, as shown in cut, but they can be furnished with their driving crank on the left-hand side when so ordered.

The lubricating facilities of the Counters are such that the oil has free access to all the frictional surfaces.

For prices, see next page.

ASHCROFT REVOLUTION COUNTERS

With Round Cases



Sectional View

Fig. 346

PRICES EACH

Size			Brass Deep Case	Nickeled Deep Case
12-inch	Dial,	8 Wheels	$110.00	$114.00
10	"	8 "	95.00	98.00
8½	"	8 "	80.00	82.50
12	"	6 "	100.00	104.00
10	"	6 "	85.00	88.00
8½	"	6 "	70.00	72.50
6¾	"	6 "	60.00	62.00

Directions for connecting, operating, and resetting these Counters are given on page 64.

Testimonials from prominent users of the Ashcroft Revolution Counters are published on page 65.

ASHCROFT
REVOLUTION COUNTERS WITH ROUND CASES

Fig. 1.

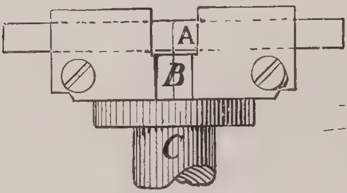


Fig. 2.

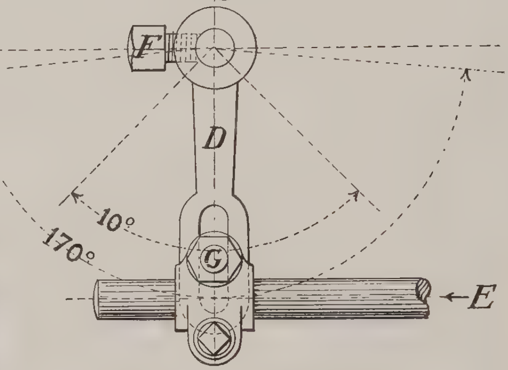
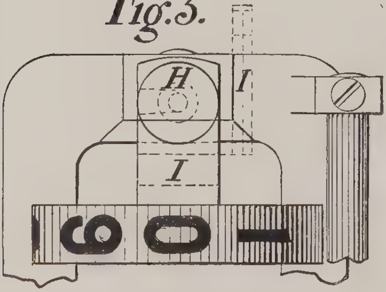


Fig. 3.



DIRECTIONS

Fig. 1 is a plan view of the crank end of movement of a right-hand Counter.

Fig. 2 is a view of crank connected to the shaft of Counter with its slotted end attached to a pitman or connection from engine for reciprocating motion.

Fig. 3 is a plan view of rear end of movement farthest away from crank, showing latch for loosening wheels to reset them.

TO CONNECT FOR RECIPROCATING MOTION

When engine is at half-stroke, the Counter crank D should be at right angles to pitman or connection E, as shown in Fig. 2 and securely fastened to crank pin G. This arrangement ensures an equal travel of the crank each side of the center line of motion, which should not be less than 90° or more than 170° at the extreme, and as shown in dotted lines in Fig. 2; then loosen set screw F, Fig. 2, open Counter to view, and revolve the driving shaft C, Fig. 1, in either direction until line A on the steel sliding plate matches line B on brass cap plate on movement frame; then tighten the set screw F *firmly* on shaft C.

The lines "1 1" on brass cap plate of Counter movement indicate the *full travel* of the steel sliding plate, and line "A" *must* match one of them when engine is on either dead center.

When attaching Counter to a *compound* engine having its *cranks set at angles* with each other, the adjusting of the Counter should be governed by the *high pressure* crank.

TO CONNECT FOR ROTARY MOTION

When engine is at half-stroke, the line "A" on the steel sliding plate must match line B on brass cap plate of counter movement, so as to ensure an equal travel of A each side of the center.

TO RESET THE COUNTER

To reset the counting wheels, loosen the knurled head screw "H," Fig. 3, enough to unlatch wheel stop "I," and slide it back as shown in dotted lines "I." The wheels will then be unlocked and free to slide back on their shaft, and can be revolved to the desired position for resetting.

ASHCROFT
REVOLUTION COUNTERS WITH ROUND CASES

The Wm. Cramp & Sons Ship and Engine Building Co.

PHILADELPHIA, January 20, 1899.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: We are pleased to state that the Ashcroft Revolution Counter, as furnished by your company for all engines which we build at our yards, has been very satisfactory. Yours truly,

(Signed) EDWIN S. CRAMP,
Superintending Engineer.

The Edward P. Allis Company

MILWAUKEE, Wis., December 21, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: In reference to your Ashcroft Revolution Counters, we wish to say that we have used a large number of them, and found them to be thoroughly accurate and reliable. The driving mechanism is a thoroughly mechanical affair, substantially gotten up, and absolutely reliable. In fact, the entire mechanism of the Counter leaves nothing to be desired.

Yours truly,
(Signed) IRVING H. REYNOLDS.

Newport News Shipbuilding and Dry Dock Company

NEW YORK, January 3, 1899.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Dear Sirs: If asked to name a first-class Revolution Counter for marine work, thoroughly trustworthy, we should not hesitate to recommend the Ashcroft, which, in our experience, has proved to be the ‘‘old reliable,’ always to be depended on when conditions are exacting.

Congratulating you on the success you have attained, we remain,

Very truly yours,
(Signed) C. B. ORCUTT, President.

ASHCROFT LOCOMOTIVE, MARINE, AND ENGINE ROOM CLOCKS

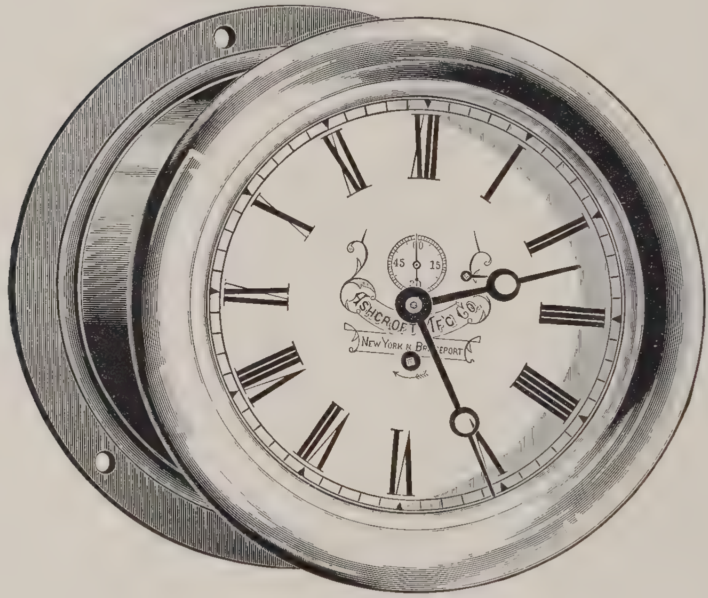


Fig. 347

These Clocks are designed for use in Engine Rooms in general, for Marine Service, and for use on Locomotives.

GENERAL DESCRIPTION

These Clocks are made up in heavy brass cases. Dials are made of copper, silvered, and engraved. Rings are hinged and locked. Movements are of the different prominent makes, as noted on opposite page.

For prices, see next page.

ASHCROFT LOCOMOTIVE, MARINE, AND ENGINE ROOM CLOCKS

PRICES EACH

SIZE	MOVEMENT	TIME	BRASS CASE	N. P. CASE
12-inch Dial	Howard	8 day	$110.00	$114.00
10 "	"	"	90.00	93.00
8½ "	"	"	80.00	82.50
6¾ "	"	"	70.00	72.00
12 "	Seth Thomas	"	90.00	94.00
10 "	"	"	65.00	68.00
8½ "	"	"	55.00	57.50
6¾ "	"	"	45.00	47.00
12 "	Harvard	"	90.00	94.00
10 "	"	"	65.00	68.00
8½ "	"	"	55.00	57.50
6¾ "	"	"	45.00	47.00
6 "	"	"	40.00	41.50
5½ "	"	"	38.00	39.25
5 "	"	"	35.00	36.00

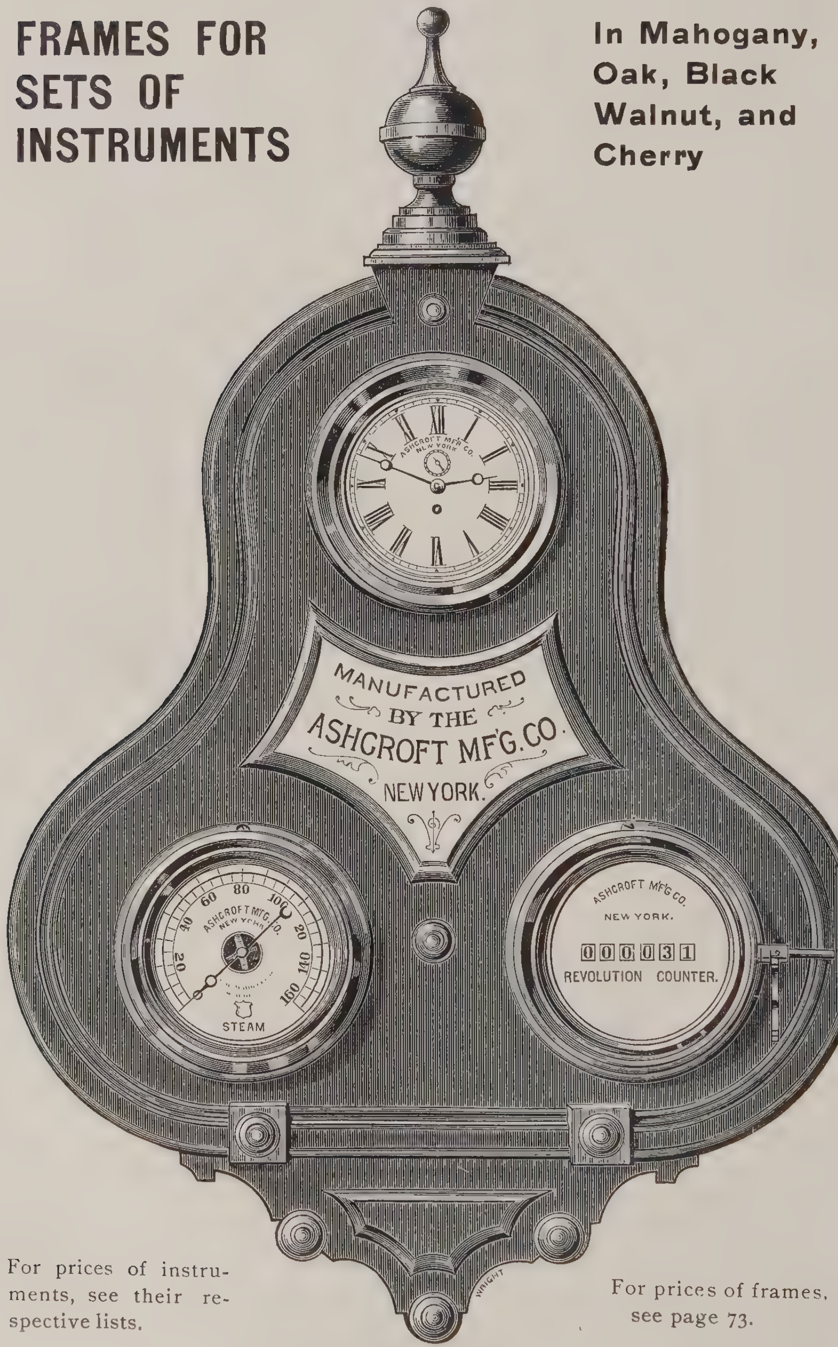
The Howard and Harvard are full jeweled movements; are chronometer-balanced, and are fitted with patent regulators.

We can also furnish clocks with Yankee movements. (Prices on application.)

Unless otherwise ordered, these Clocks always have deep cases. The depth of the Howard and Seth Thomas movements will not admit of their being used in any but a deep case, but the Harvard movement, which is of less depth, can be furnished in our regular standard size gauge case, if so called for in order.

FRAMES FOR SETS OF INSTRUMENTS

In Mahogany, Oak, Black Walnut, and Cherry



For prices of instruments, see their respective lists.

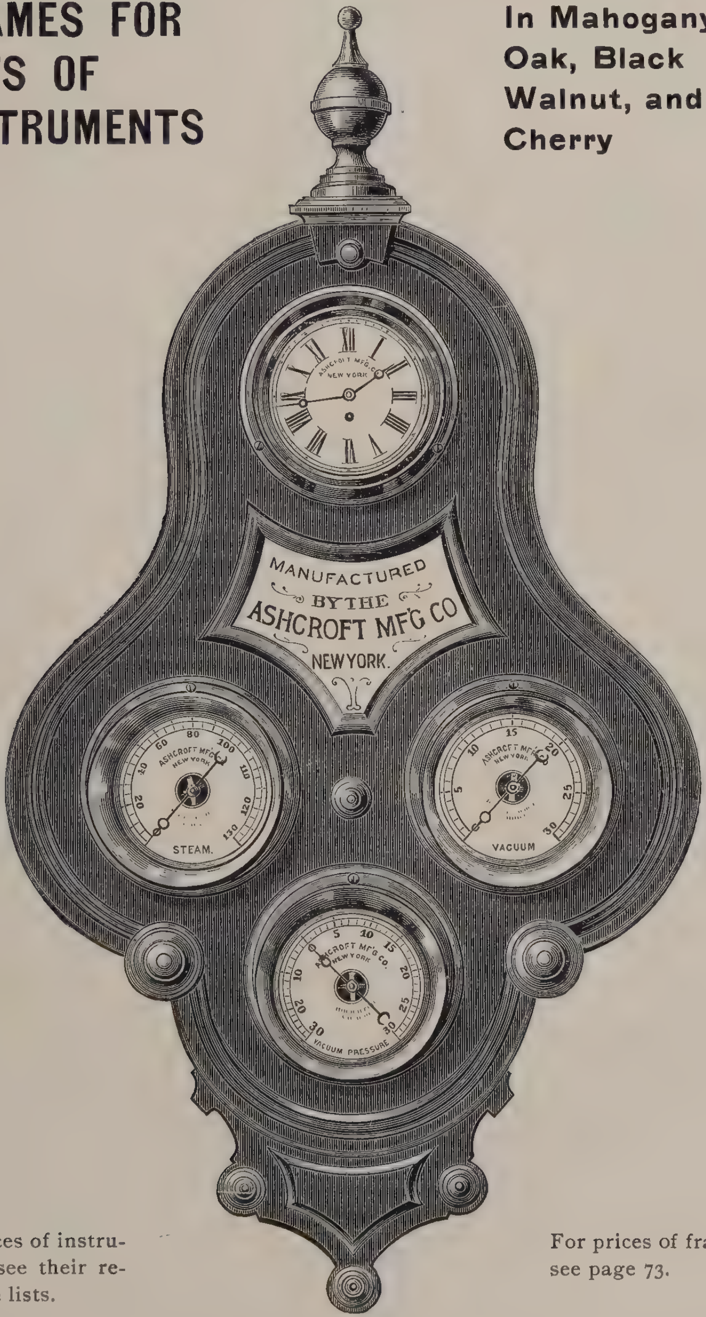
For prices of frames, see page 73.

Fig. 348

For Engine Rooms of Steamships, Waterworks, Mills, Electric Plants, Mines, Factories, and Office Buildings.

FRAMES FOR SETS OF INSTRUMENTS

In Mahogany, Oak, Black Walnut, and Cherry



For prices of instruments, see their respective lists.

For prices of frames, see page 73.

Fig. 349

For Engine Rooms of Steamships, Waterworks, Mills, Electric Plants, Mines, Factories, and Office Buildings.

FRAMES FOR SETS OF INSTRUMENTS

In Mahogany, Oak, Black Walnut, or Cherry

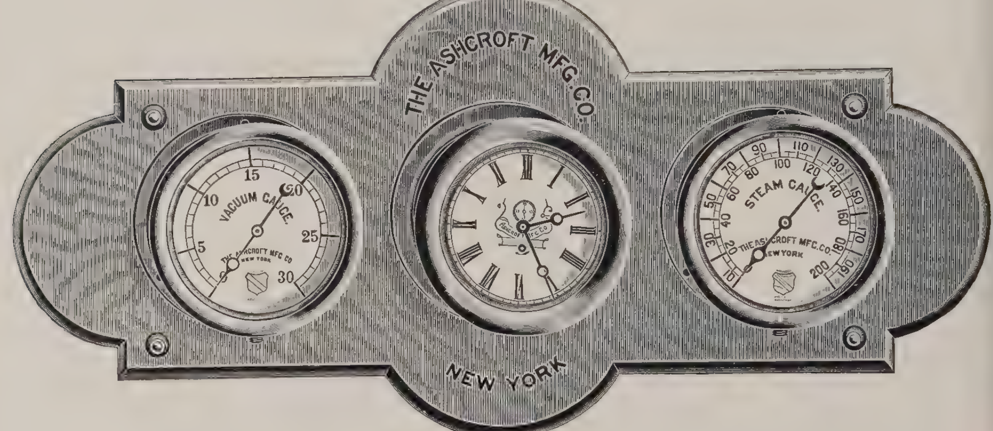


Fig. 350

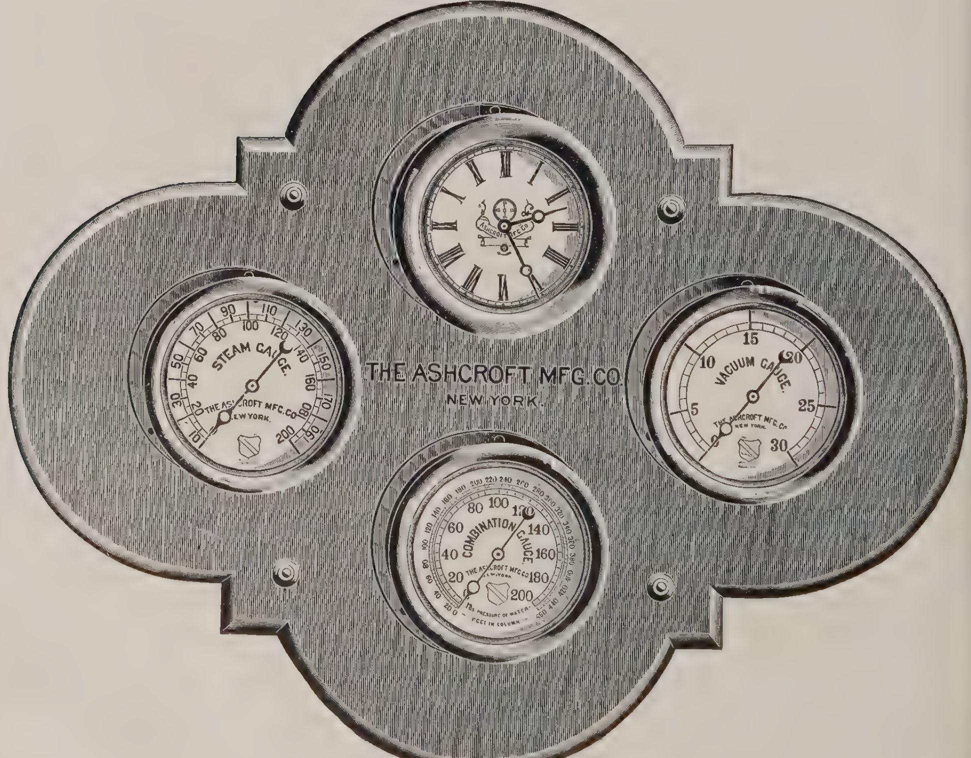


Fig. 351

For Engine Rooms of Steamships, Waterworks, Mills, Electric Plants, Mines, Factories and Office Buildings.

FRAMES FOR SETS OF INSTRUMENTS

In Mahogany, Oak, Black Walnut, or Cherry

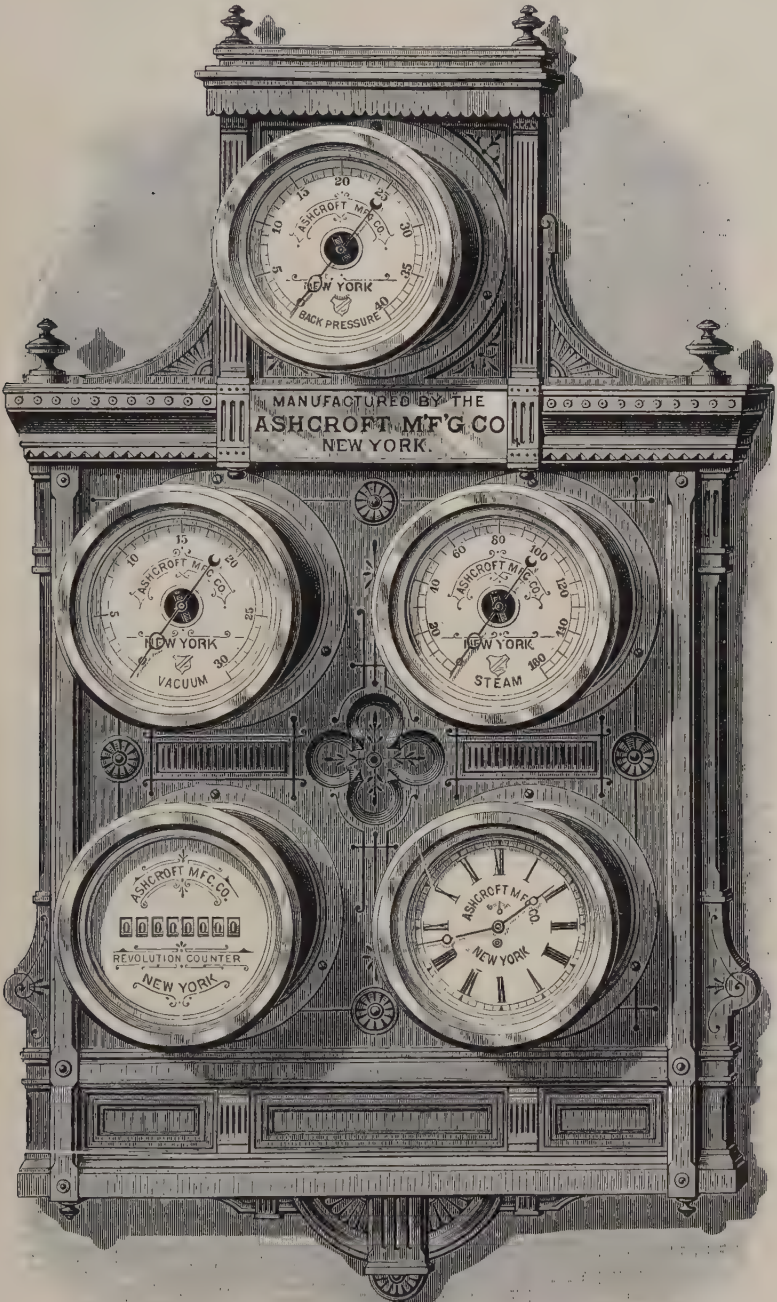


Fig. 352

STONE, SLATE, AND MARBLE SLABS

Highly Polished for Sets of Instruments

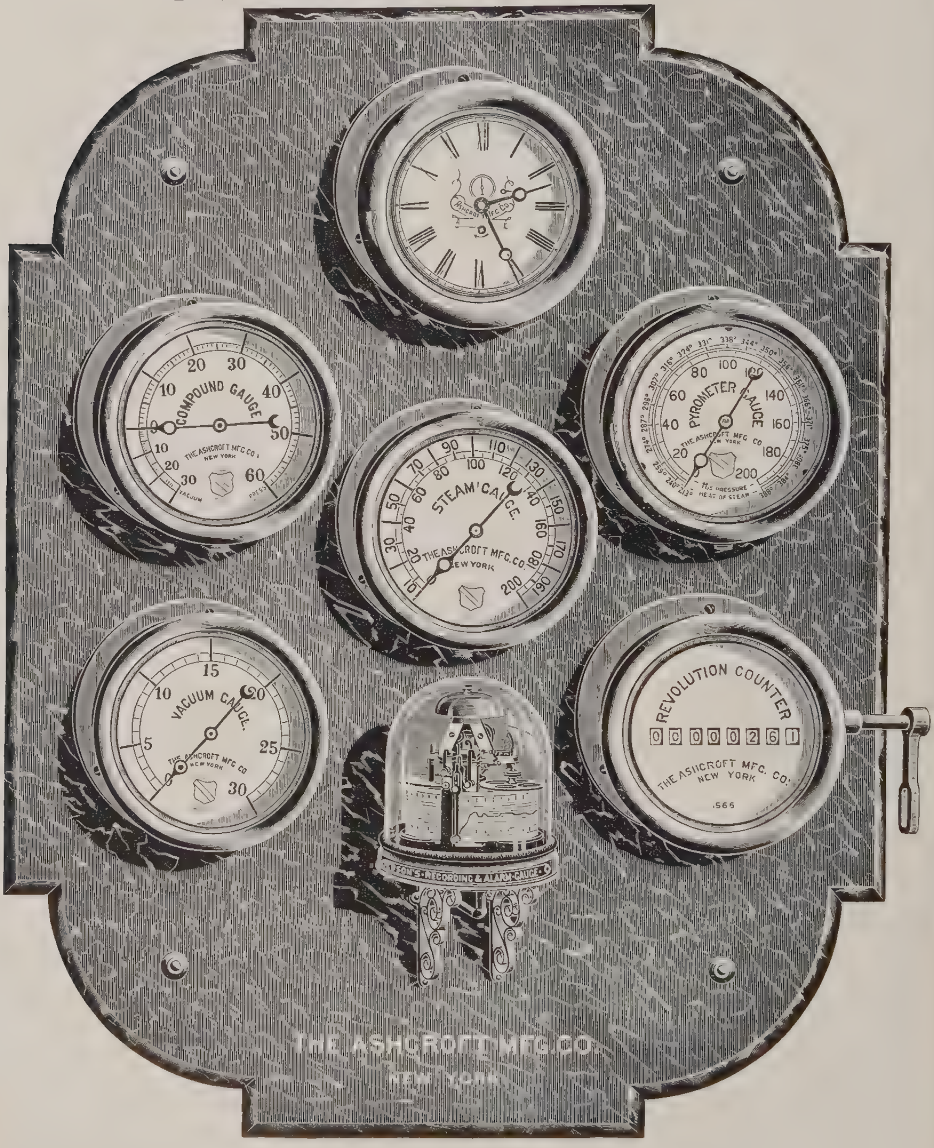


Fig. 353

For Engine Rooms of Waterworks, Electric Plants, Mills, Factories, Mines, and Office Buildings.

PRICES

For prices of instruments, see their respective lists. Prices of Slabs on application.

MAHOGANY, OAK, CHERRY, AND BLACK WALNUT FRAMES

Highly Polished, as Shown on Pages 68, 69, 70, and 71

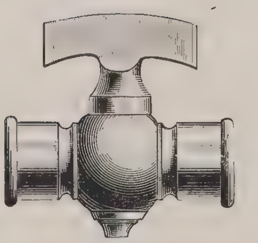
PRICES

	Pattern	Pattern
	Regular	Eastlake
To hold two 6-inch Dial instruments	$8.00	
“ three 6 “ “ “	13.00	
“ four 6 “ “ “	16.00	$22.00
“ five 6 “ “ “	20.00	30.00
“ seven 6 “ “ “		40.00
“ two 6¾ “ “ “	13.00	
“ three 6¾ “ “ “	15.00	
“ four 6¾ “ “ “	20.00	27.00
“ five 6¾ “ “ “	25.00	35.00
“ seven 6¾ “ “ “		45.00
“ two 8½ “ “ “	15.00	
“ three 8½ “ “ “	20.00	
“ four 8½ “ “ “	25.00	33.00
“ five 8½ “ “ “	30.00	42.00
“ seven 8½ “ “ “		55.00
“ two 10 “ “ “	18.00	
“ three 10 “ “ “	22.00	
“ four 10 “ “ “	30.00	40.00
“ five 10 “ “ “	35.00	52.00
“ seven 10 “ “ “		70.00
“ two 12 “ “ “	20.00	
“ three 12 “ “ “	25.00	
“ four 12 “ “ “	32.00	48.00
“ five 12 “ “ “	38.00	60.00
“ seven 12 “ “ “		80.00

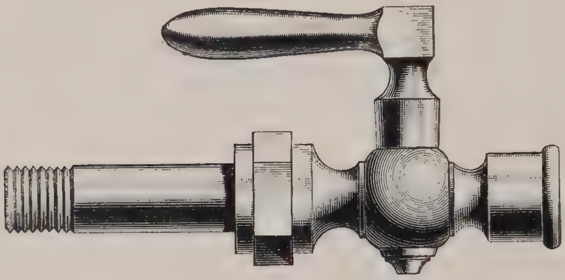
Extra for hand-engraved name plates at cost.

Prices on plain frames, no moulding, on application.

ASHCROFT STEAM GAUGE COCKS



T Handle Gauge Cock
Fig. 354



Union Gauge Cock
Fig. 355

PRICES EACH

		Brass	N. P.
Small T Handle Gauge Cock.	Fig. 354	$ .50	$ .75
Large " " " "	" 354	1.00	1.50
Small Union ' "	" 355	1.50	2.00
Large " " "	" 355	2.00	2.50

SPECIAL NOTICE

We never send Cocks with 2½-inch dial Gauges unless called for in order.

With all other sized Gauges we always send Cocks as designated below.

3½, 4½, and 5-inch	dial,	Iron	Case	Gauges	have small T Handle Cocks.	Fig. 354.
3, 3½, 4½, and 5-inch	"	Brass	"	"		
6 and 6¾-inch	"	Iron	"	"	have large T Handle Cocks.	Fig. 354.
5½-inch	"	Brass	"	"		
6 and 6¾-inch	"	Brass	"	"	have small Union Cocks.	Fig. 355.
8½, 10, and 12-inch	"	Iron	"	"	have large Union Cocks.	Fig. 355.
8½, 10, and 12-inch	"	Brass	"	"		

ASHCROFT COIL PIPE SIPHONS

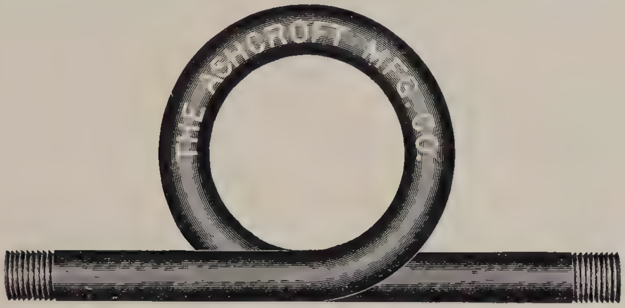


Fig. 356

A Siphon of some character must be used on every Steam Gauge to prevent anything but water entering the Gauge spring; the shape of Siphon, as shown above, is the one generally used, but they can be bent into any shape required.

PRICES

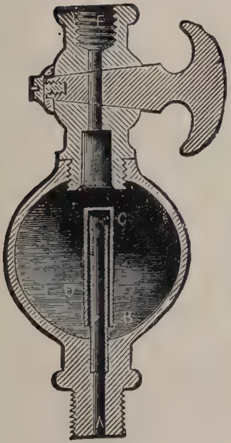
Iron	Pipe Siphon	$ .25 each
Brass	" "	1.00 "
Nickeled	" "	1.50 "

ASHCROFT STEAM GAUGE SIPHON COCKS

Prindle's Patent

Specially Adapted for Portable and Traction Engines

No. 1



Sectional View
Fig. 357

No. 1

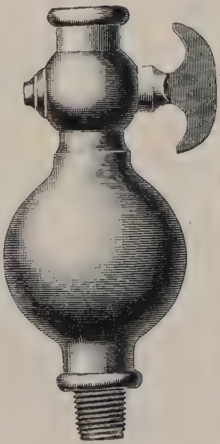


Fig. 358

No. 2

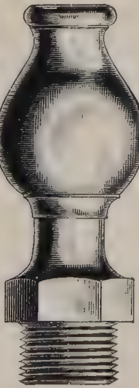


Fig. 359

No. 3

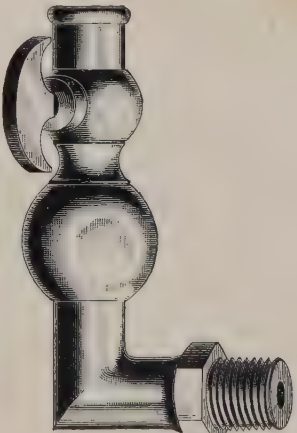


Fig. 360

The sectional cut shows a loose cap over the pipe which extends into the globe chamber; this deflects the entering steam to the bottom, where it condenses in the chamber, and thus effectually prevents any live steam from reaching the spring of the Gauge. The cap over pipe falls as pressure is removed, making a Siphon which is self-emptying.

PRICES EACH

Straight	Siphon,	without cock,	Fig. 359	Brass, $1.00	N. P., $1.50
"	"	with "	" 358	" 1.50	" 2.00
Elbow	"	without "	" 360	" 1.25	" 1.75
"	"	with "	" 360	" 1.50	" 2.00

KEYSER AUTOMATIC SAFETY WATER GAUGES

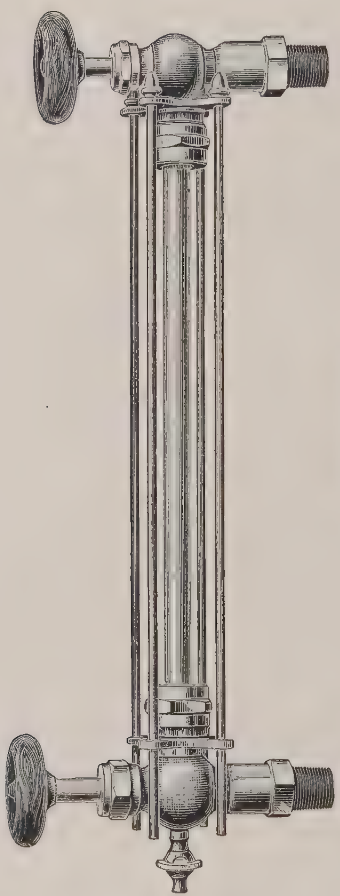


Fig. 361

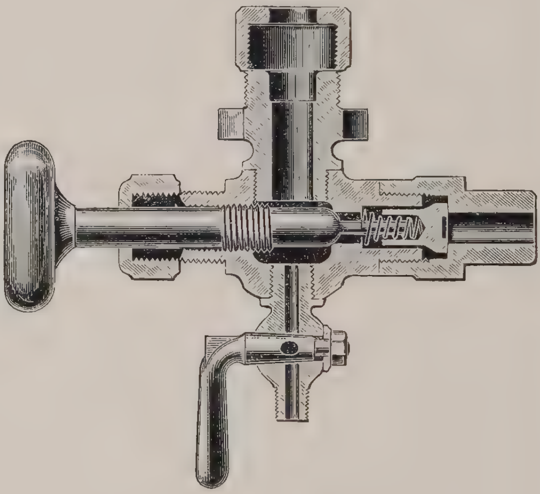


Fig. 362

These Automatic Self-closing Water Gauges can be used for salt or fresh water, and they are on the boilers of all the new ships of the United States Navy, as well as on many lake, river and sound steamers, and stationary plants. They are fully guaranteed, and are a valuable life-protecting addition to any steam boiler. A description of these Gauges will be found in the letters published on the opposite page.

PRICES

½-inch Water Gauge, with glasses and rods, 20 inches long	$12.00 each
¾- " " " " " " " 24 " "	15.00 "

KEYSER AUTOMATIC SAFETY WATER GAUGES

This invention relates to an Automatic Water Gauge, which, in case of the breakage of the glass, will automatically close the steam or water part and prevent the escape of steam into the fire room. If at any time the glass tube should break while a pressure was on the boiler, the check valve at the upper and lower ends instantly closes and prevents the escape of steam and water. The Water Gauge has been in constant use on board the United States Tug Nina (salt water feed) from February 4 up to June 1, and has worked exceedingly well, no derangement of any of its working parts being noticeable. When the Gauge was tested the boiler had a pressure of fifty (50) pounds per square inch. The glass was suddenly broken by means of a short chisel bar, when the check valves on top and bottom of the Gauge instantly closed and prevented any escape of steam or water. The fractured part of the glass was then removed and a new glass inserted by simply securing in the handler. The check valves were unseated and came under the action of the spring, and, by again opening the valve, water immediately resumed its place within the tube. The advantages of the Automatic Water Gauge are that in boilers carrying high pressure steam, should the Water Gauge on them break at any time, the escape of steam and water, as is usual in such cases, is immediately controlled by the automatic action of the check valve. We therefore recommend it for purchase and use as required by Act approved July 18, 1861.

(Signed) John W. Moore, Chief Engineer, U. S. N.
J. J. Barry, P. A. Engineer, U. S. N.

New York Lighterage and Transportation Company

New York, December 23, 1893.

The Ashcroft Manufacturing Co.
New York

Gentlemen: I am in receipt of yours of the 22d inst., asking me how I am pleased with the Keyser Automatic Water Gauges, and will say it is the best thing of the kind I have ever seen, and I would not part with those I have.

I have two boilers in my yacht, and was unfortunate enough to have both of my water glasses break at the same time, with over 200 pounds pressure. The glass cut the engineer's face badly, and a piece of the glass got into one of my crank pin oil cups and nearly ruined the brass. It was a long time before we were able to shut off the steam from the Gauge Cocks, and had our pumps not been working, and we lying still, I think we would have blown nearly all of the water out of the boiler.

I have had my glasses broken since I had the Keyser Gauges on with 250 pounds steam, and they work like a charm, and could not see there was any steam escaped.

Very truly yours,
(Signed) H. B. Moore, President.

The William Cramp & Sons Ship and Engine Building Co.

Philadelphia, January 20, 1899.

The Ashcroft Manufacturing Co.
New York

Gentlemen: In these days of high pressures, the different fittings required on the modern high-pressure boilers have the special attention of engineers, and, in this connection, we beg to say that the Keyser Automatic Safety Water Gauge is such that we recommend its use.

Yours truly,
(Signed) Edwin S. Cramp, Superintending Engineer.

ASHCROFT SELF-CLEANING WATER GAUGES

For High Pressure Work

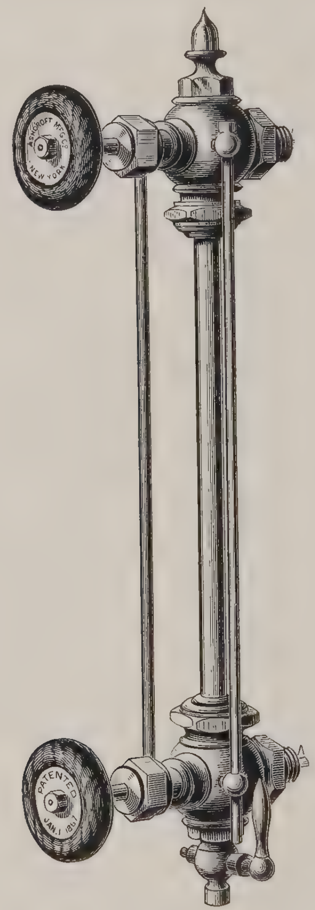


Fig. 363

These Water Gauges are made from extra heavy patterns, have self-cleaners, and are warranted for high pressures.

PRICE

¾-inch connection, with glasses and rods, 24 inches long . . . . $16.00 each

The self-cleaning attachment, A, is a flattened rod extending through the body of the Gauge Cock and into the boiler, and, being secured to the handle, when it turns, the self-cleaner turns and disturbs all accumulation of sediment, which blows out when cock is opened; thus a free passage for steam or water is always secured.

ASHCROFT SELF-CLEANING GAUGE COCKS

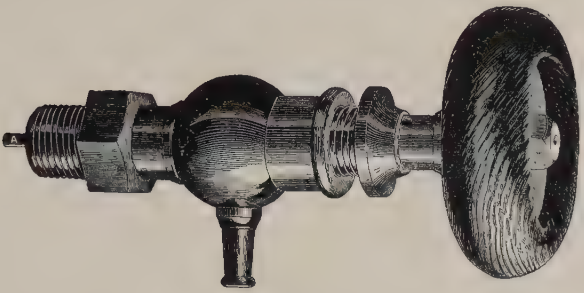


Fig. 364

We can recommend these Gauge Cocks to anyone desiring a well-made, steam tight cock for high pressure.

The self-cleaning attachment, A, is a flattened rod extending through the body of the Gauge Cock and into the boiler, and, being secured to the handle, when it turns, the self-cleaner turns and disturbs all accumulation of sediment, which blows out when cock is opened; thus a free passage for steam or water is always secured.

PRICES

½-inch, brass	each, $2.25
¾ " "	" 2.50

ASHCROFT
SELF-CLEANING LOCOMOTIVE GAUGE COCKS

With Nickel Seats

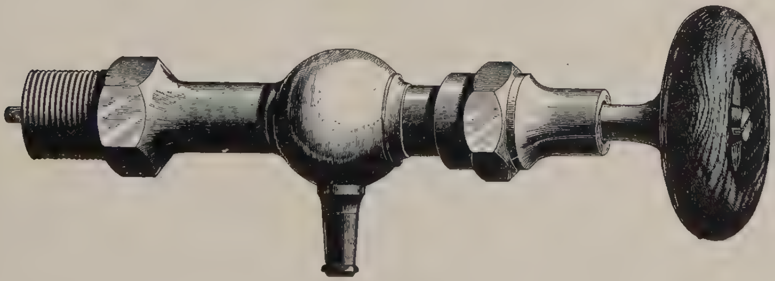


Fig. 365

These Gauge Cocks are heavy and strong, and have self-cleaning attachments, as described above. The nickel seats are non-corrosive, and, being very hard, render the Gauge Cocks practically indestructible. They are made more especially for locomotive use.

PRICE

¾-inch, brass	each, $3.00

ASHCROFT COMBINATION WATER COLUMNS

Specially Adapted for High-Pressure Work

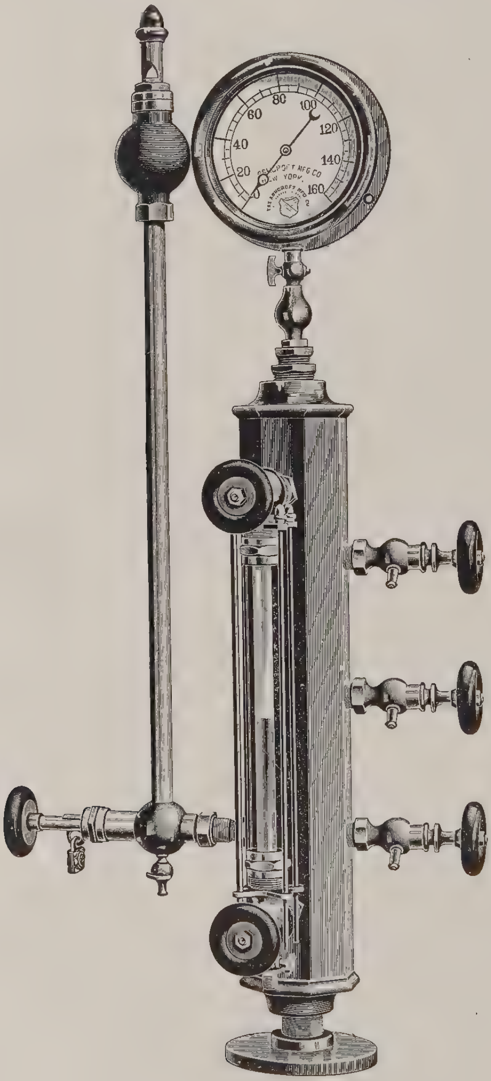


Fig. 366

We can recommend this Column to anyone desiring an efficient safeguard to their boilers; the Steam Gauge, Low Water Detector, Water Gauge, and Gauge Cocks are fully described on pages 18, 19, 76, 77, 79, and 126.

PRICES

Octagon Water Column, with 6¾-inch Brass Case, Auxiliary Spring, Steam Gauge, ¾-inch Keyser Automatic Water Gauge, Low Water Detector, ¾-inch Self-cleaning Gauge Cocks, and Siphon Cock for Steam Gauge . . . . $50.00 each

FOUR-TONE ADJUSTABLE CHIME WHISTLES

FIG. 367
WITH VALVE AND
REVERSIBLE LEVER

FIG. 368
WITHOUT VALVE

No. 1

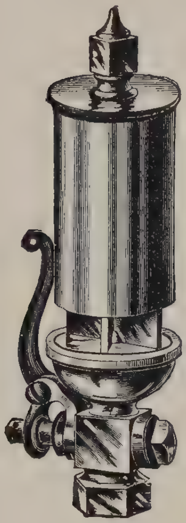


Fig. 367

No. 2

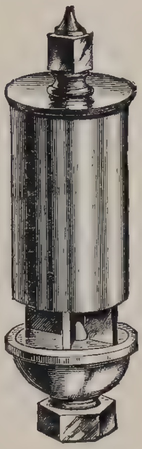


Fig. 368

The combination of tones produces sound vibrations of much greater volume than can be obtained by a single tone, consequently it can be heard much farther than a common whistle.

A desirable feature is the adjustable bell, which can be raised or lowered to conform to the steam pressure under which the Whistle is used. It is well known that a Whistle made to blow at a low pressure will become shrill and discordant under high pressure. By the movable bell, it can be set at a point to produce a clear, full tone under any pressure, thus avoiding the disagreeable screeching not uncommon in many Whistles.

PRICES

Diameter of Bell	Size of Pipe Connection	No. 1, with Adjustable Lever Valve, each	No. 2, without Valve, each	Diameter of Bell	Size of Pipe Connection	No. 1, with Adjustable Lever Valve, each	No. 2, without Valve, each
2 inch	½ inch	$7.00	$5.00	10 inch	2½ inch	$180.00	$150.00
2½ "	½ "	9.00	7.00	12 "	3 "	300.00	260.00
3 "	¾ "	11.00	8.00	14 "	3 "	. . .	. . .
4 "	1 "	18.00	14.00	16 "	3 "	. . .	. . .
5 "	1¼ "	28.00	22.00	18 "	4 "	. . .	. . .
6 "	1½ "	42.00	38.00	20 "	4 "	. . .	. . .
8 "	2 "	100.00	85.00	. . .	. . .	. . .	. . .

DIRECTIONS FOR ADJUSTING

Loosen the square nut or "acorn" on top with a wrench, then by the square directly under the "acorn" raise or lower the bell to conform to the pressure used.

If it is desired to blow at a lower pressure, screw down the bell until the proper distance is reached between the bell and bowl to ensure a clear tone.

If at a higher pressure, screw up the bell.

ASHCROFT
INSPECTORS' TEST PUMPS AND GAUGES

In Morocco Case

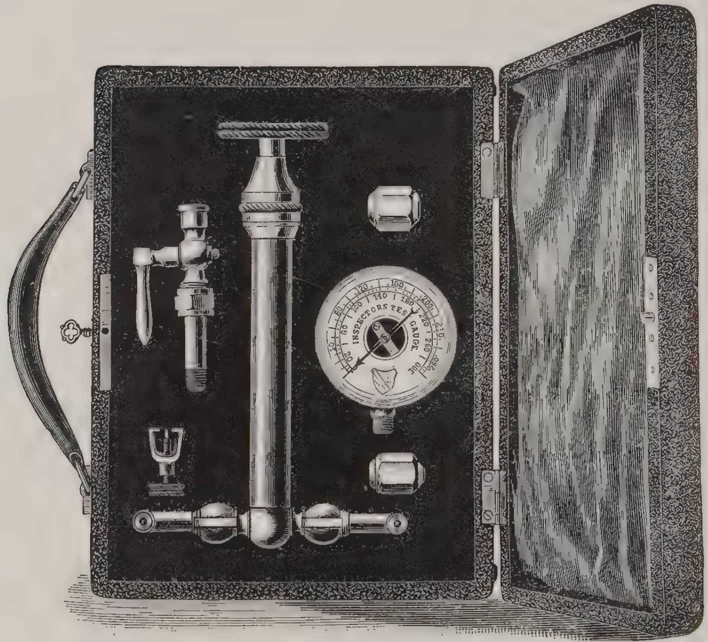


Fig. 369

This complete outfit will be found a very convenient portable apparatus for testing Gauges. The pump is good and strong, and the case is fitted with a substantial lock.

A full description of the Test Gauge is given on pages 46 and 48.

PRICE, $45.00 EACH

This set consists of:

1 Nickel-plated Test Pump.
1 " " 3-inch Dial Test Gauge, 300 pounds.
1 " " Union Cock.
2 " " ¼ Hexagon Couplings.
1 " " Steam Gauge Hand Remover.
1 " " Hand Set.

This set, in velvet lined morocco case, weighs 8 pounds.

ASHCROFT LEVER HANDLE TEST PUMPS AND GAUGES

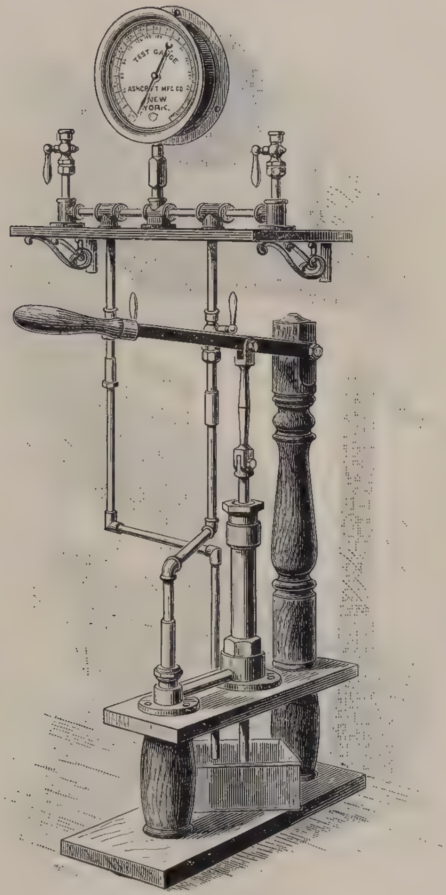


Fig. 370

This Lever Handle style of Test Pump is mounted on a black walnut stand, with its Gauge fittings on a separate black walnut shelf, which can be stationed in any desired location.

The Pump is intended principally for use in testing Pressure Gauges, for which the shelf has three separate connections, so that two Gauges can be compared with the Test Gauge at the same time, this Test Gauge being mounted on the central fitting.

The Pump is operated by the Lever Handle, and is a very complete apparatus, particularly desirable to anyone having quantities of Gauges that require frequent testing. The fittings are all heavy and substantial, and the Test Gauge is fully described on pages 46 and 47.

PRICES

Test Pump, complete, with 8½-inch Brass Case Test Gauge, graduated to 300 lbs. in 1 lb. marks	$100.00 each
Test Pump, complete, with 6¾-inch Brass Case Test Gauge, graduated to 300 lbs. in 1 lb. marks	90.00 "
Test Pump only, no gauge	60.00 "

Prices on Pumps of this design for pressures above 300 pounds will be given on application.

ASHCROFT SCREW TEST PUMPS AND GAUGES

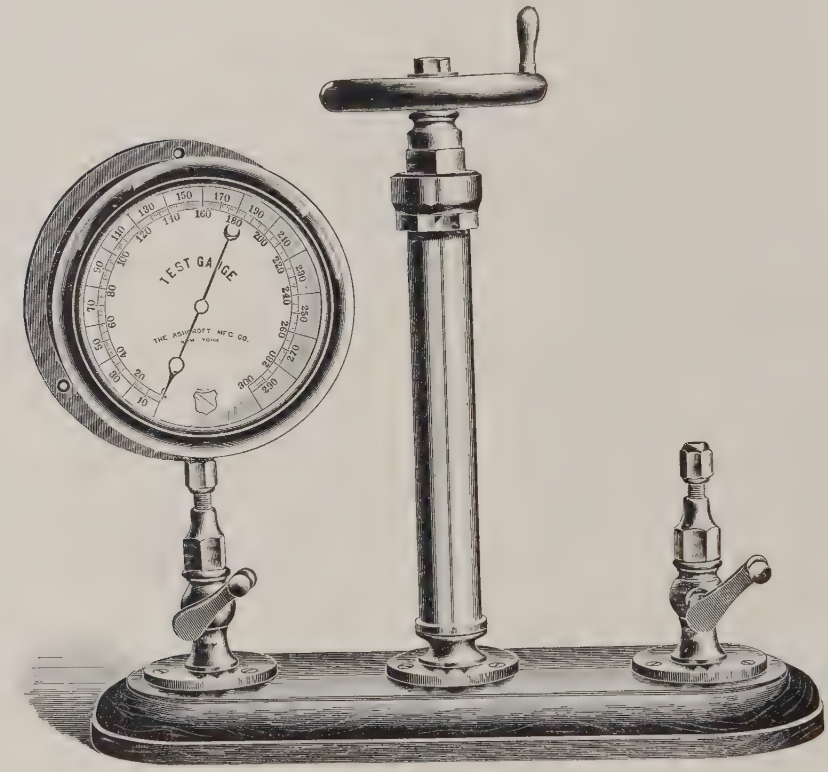


Fig. 371

This cut shows a screw handle style of portable Test Pump for testing Pressure Gauges one at a time, in comparison with a Test Gauge. It is well and substantially made and is mounted on a black walnut base.

PRICES.

	Each
Test Pump, complete with 8½-inch Brass Case Test Gauge, graduated to 300 pounds in 1-pound marks	$90.00
Test Pump, complete with 6¾-inch Brass Case Test Gauge, graduated to 300 pounds in 1-pound marks	80.00
Test Pump only, no gauge	50.00

Prices on Pumps of this design for pressures above 300 pounds will be given on application.

ASHCROFT BOILER TEST PUMPS AND GAUGES

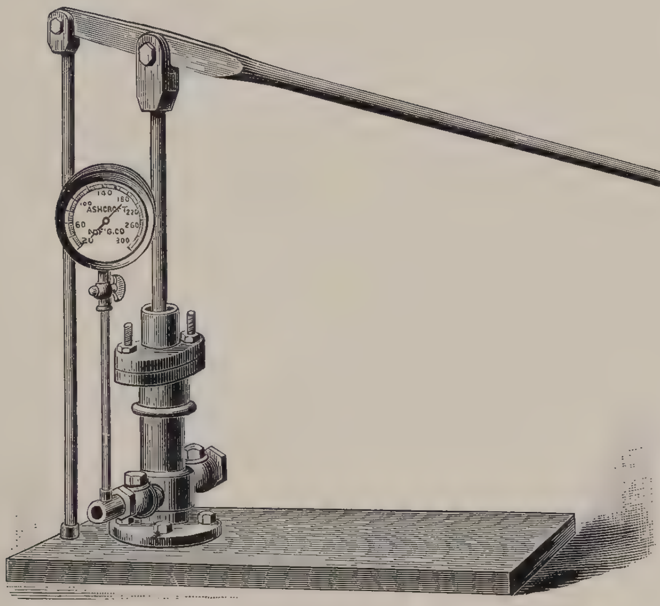


Fig. 372

This Pump is used for testing steam boilers and other steam reservoirs with water pressure, and is mounted on a suitable sized and convenient wooden base, and is sufficiently strong for water pressures up to 500 pounds to the square inch. The connections are 1-inch suction and discharge and the plunger is 1⅝-inch diameter.

PRICES

	Each
Pump, complete with 5-inch dial Iron Case Test Gauge	$35.00
" no gauge	30.00

CONNECTIONS

Plunger, 1¼ inches diameter; suction, 1 inch diameter; discharge, 1 inch diameter.

ASHCROFT
PROVING PUMPS AND SPRING GAUGES

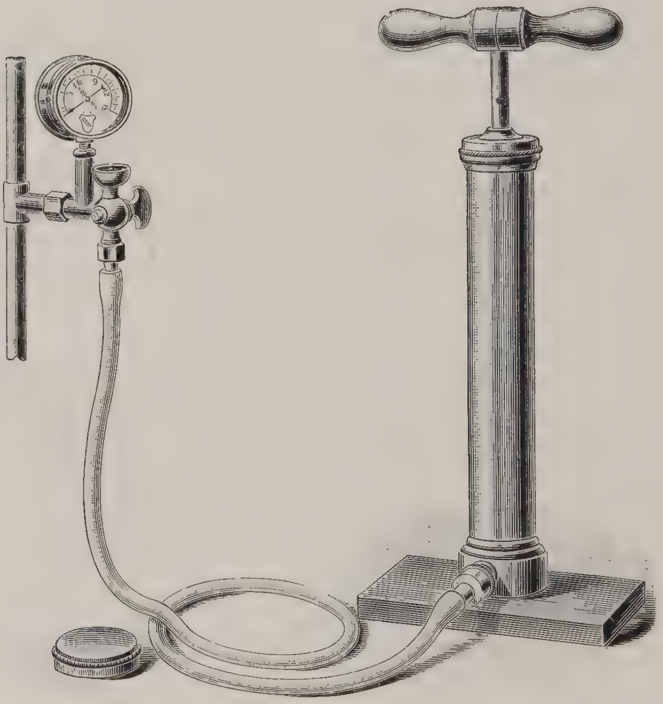


Fig. 373

These Pumps and Spring Gauges are for gasfitters' use for testing pipes for imperfections and leakages.

PRICES

	Each
Pump and Spring Gauge and Ether Cup, as above	$16.00
Pump and Hose only	8.00
Brass Case Gauge, 2½-inch dial, with brass cover	5.00
Ether Cup and Cock	3.00

ASHCROFT
PROVING PUMPS AND MERCURY GAUGES

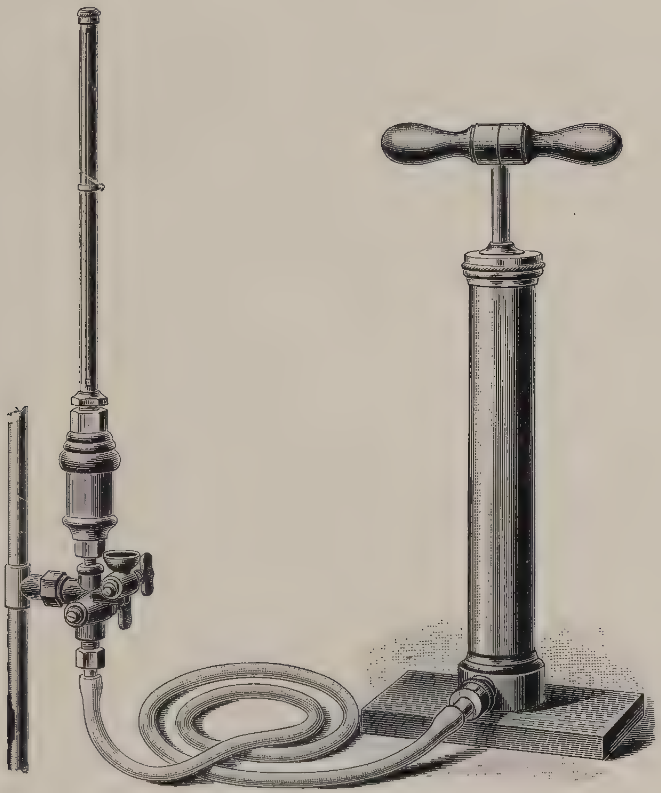


Fig. 374

These Pumps and Mercury Gauges are designed for the same use as those described on the opposite page.

PRICES

	Each
Pump and Mercury Gauge and Ether Cup, as above	$16.00
Pump and Hose only	8.00
*Mercury Gauge and Ether Cup and Cock	8.00

*The Ether Cup and Cock is cast solid to the Mercury Gauge.

GENUINE SCOTCH GAUGE GLASSES

TOMEY'S BRAND

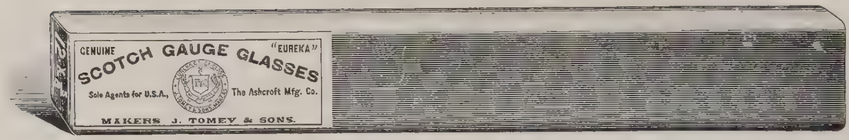


Fig. 375

We were the original importers of Scotch Gauge Glasses into this country, and have been selling the genuine Tomey brand since the year 1851. We warrant them genuine and fully equal to any on the market. They are all carefully wrapped in labeled packages, as shown above.

PRICES PER DOZEN

Length	External Diameter				
inches	½	⅝	¾	⅞	**1 in.**
10	Same price as corresponding length of ⅝ glasses.	$3.00	$3.60	$5.04	$6.12
11		3.24	3.96	5.64	6.72
12		3.60	4.32	6.12	7.32
13		3.84	4.80	6.60	7.92
14		4.20	5.16	7.08	8.52
15		4.44	5.52	7.56	9.12
16		4.80	5.88	8.16	9.72
17		5.04	6.24	8.64	10.32
18		5.40	6.60	9.12	10.92
19		5.64	7.08	9.60	11.52
20		6.00	7.44	10.20	12.12
22		6.60	8.16	11.16	13.44
24		7.20	8.88	12.12	14.64
30		9.00	11.16	15.24	18.24
36		10.80	13.44	18.24	21.96
48		14.52	18.00	24.36	29.16
60		18.12	22.56	30.48	36.48
72		21.84	27.12	36.48	43.80
60 x 1¼ inches, $60.00.					

GAUGE GLASS CUTTERS

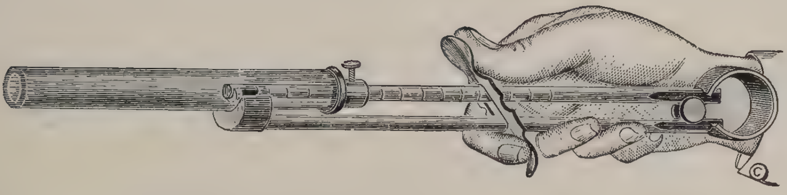


Fig. 376

This is a very handy tool for accurately cutting Scotch Gauge Glasses to any desired length.

PRICE, $2.00 EACH

RUBBER GAUGE GLASS WASHERS

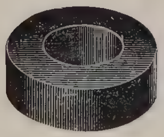


Fig. 377

PRICES

For ½-inch Gauge Glasses, each	2 cents	per pound, $3.00
" ⅝- " " " "	4	per pound, 3.00
" ¾- " " " "	4	per pound, 3.00

TABOR SPEED COUNTERS

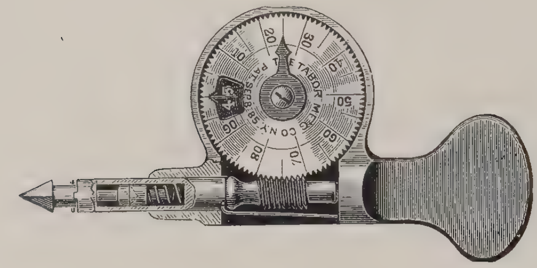


Fig. 378

PRICE, $1.00 EACH

The urgent need of a *good*, simple stop motion Revolution Counter, that could be put upon the market at a price low enough to be within the reach of all mechanics, led us to bring out this little instrument.

TO SET TO ZERO

Pull out the spindle till the worm touches the spring, and with the thumb and finger turn one dial over the other, until the notch on top dial is over 49 on the under dial, which is the zero or starting point, then push the spindle back into position and slip the index pointer to the notch on top dial.

TO USE THE COUNTER

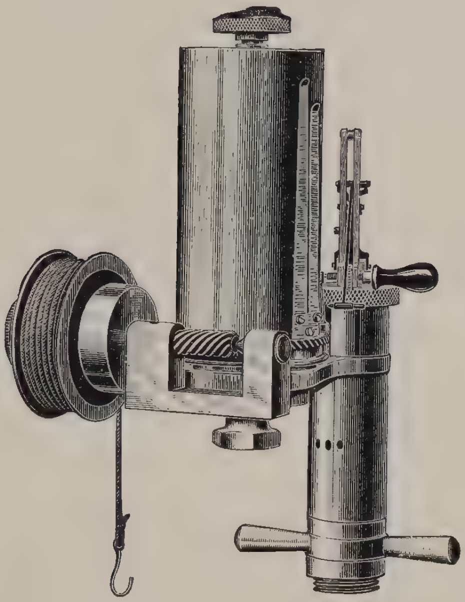
Hold watch in one hand, and with the other lightly touch the center of the end of shaft to be counted with the three-cornered point. When the watch indicates the proper time to begin the count, instantly press against shaft, which will engage the clutch, and the registry will begin and continue till the pressure on end of shaft is relieved.

HOW TO READ THE DIALS

The upper dial is graduated for 100 revolutions, and registers units; the lower dial is graduated for 49 revolutions of the top dial, and registers hundreds, making a continuous count of 4,900 possible.

The reading on the under dial is through the opening in the upper dial. The index finger indicates the count on the upper dial; for instance, if the point in the opening through the upper dial indicates 45 on the lower dial, and the index finger points to 25 on the upper dial, the reading will be 4,525 revolutions.

TABOR STEAM ENGINE INDICATORS



The Steam Engine Indicators that have come into prominent use have one essential plan of construction. There is a *steam cylinder* and a *paper drum.* The steam cylinder is designed to connect with the interior of the engine cylinder and to receive steam whenever the engine receives it. A piston, which is enclosed in the indicator steam cylinder, communicates motion to a pencil arranged to move in a straight line, the amount of movement being limited by the tension of a spiral spring against which the piston acts. The paper drum is a cylindrical shell mounted on its axis, and is made to turn forward and backward by a motion derived from the cross-head of the engine. A sheet of paper, or *card*, as it is named, is stretched upon the drum, and the pencil is brought to bear upon it. In this manner the instrument traces upon the paper a figure outline, termed the indicator diagram, which is the object sought. Since the motion of the paper drum is made to coincide with that of the piston of the engine, and the height to which the pencil rises varies according to variations in the force of the steam, the indicator diagram presents a record of the pressure of steam in the engine cylinder at every point of the stroke.

TABOR STEAM ENGINE INDICATORS

To obtain well-defined diagrams with instruments of this description, it has been found desirable to employ a spring of high tension, so as to permit but a small movement of the piston. That a suitable height of the diagram may be obtained, this plan requires the multiplication of the movement of the piston. In the means that are employed for accomplishing this result, still preserving a straight line movement, the various forms of indicators that have been extensively used find their essential differences.

The Richards Indicator, the first instrument of this kind that came into use, depended for the multiplication of the movement upon two levers, pivoted at opposite ends, and connected by a bar carrying the pencil. One of the levers at a point near the pivoted end received the motion of the piston. The use of this indicator upon engines running at high speed showed that the momentum of the multiplying device produced a disturbance in the action of the instrument which made the diagram inaccurate.

The Tabor Indicator was invented by Mr. Harris Tabor, of New York. The object sought by Mr. Tabor was to better adapt the instrument to the attainment of smooth and accurate diagrams at high speeds. He endeavored to provide a movement, having such few parts, and those of such light weight, that a quick response to the action of the steam pressure should occur at any speed liable to be met in practice. The employment of high speeds is now of frequent occurrence on stationary and marine engines, and suitable provisions for indicating in those cases have become a recognized necessity.

TABOR STEAM ENGINE INDICATORS

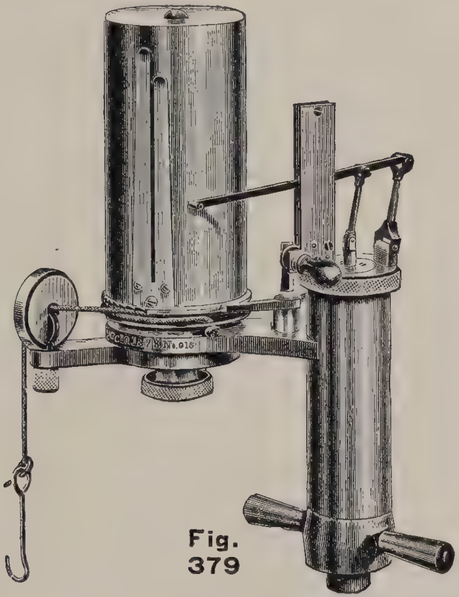


Fig. 379

PRICES

Tabor Indicator, as above shown, fully nickel-plated, with one cylinder spring, one boxwood scale, two straight cocks, 100 cards, one screw driver, one bottle of porpoise oil, two wrenches, one extra drum spring, all enclosed in a substantial, well finished, black walnut box, with nickeled-plated trimmings, each $85.00

One three-way cock in place of the two straight cocks will be furnished without extra charge, if called for.

With each outfit of Indicators we furnish, without charge, *Houghtaling's* book on the *Steam Engine Indicator and Its Appliances*, a valuable publication of 300 pages, describing the operation of the Indicator on all classes of engines.

For prices of parts and extras, see page 117.

DESCRIPTION

A prominent feature of the Tabor Indicator lies in the means employed to communicate a *straight-line movement to the pencil.* A stationary plate containing a curved slot is firmly secured in an upright position to the cover of the steam cylinder. This slot serves as a guide and controls the motion of the pencil bar. The side of the pencil bar carries a roller which turns on a pin, and this is fitted so as to roll freely from end to end of the slot. The curve of the slot is so formed, and the pin attached to such a point, that the end of the pencil bar, which carries the pencil, moves up and down in a straight line, when the roller is moved from one end of the slot to the other. The curve of the slot just compensates the tendency of the pencil point to move in a circular arc, and a straight-line motion results. The outside of the curve is nearly a true circle with a radius of one inch.

The *steam cylinder* and the base of the paper drum are made in one casting. Inside the steam cylinder is a movable lining cylinder, within which the piston of the indicator works. This cylinder is attached by means of a screw thread at the bottom, and open-

TABOR STEAM ENGINE INDICATORS

DESCRIPTION—CONTINUED

ings on opposite sides at the top are provided for the introduction of a tool for screwing it in or out. Openings through the sides of the outer cylinder are provided to allow the steam which leaks by the piston to escape.

The *pencil mechanism* is carried by the cover of the outside cylinder. The cover proper is stationary, but a nicely fitted swivel plate, which extends over nearly the whole of the cover, is provided, and to this plate the direct attachment of the pencil mechanism is made. By means of the swivel plate, the pencil mechanism may be turned so as to bring the pencil into contact with the paper drum, as is done in the act of taking a diagram; this pencil mechanism is attached to the swivel by means of the vertical plate containing the slot, which has been referred to, and a small standard placed on the opposite side of the swivel for connecting the back link. The slotted plate is backed by another plate of similar size, which serves to receive the pressure brought to bear on the pencil bar when taking diagrams, and to keep the pencil bar in place. The pencil mechanism consists of three pieces: the pencil bar, the back link, and the piston rod link. The two links are parallel with each other in every position they may assume. The lower pivots of these links and the pencil point are always in the same straight line. If an imaginary link be supposed to connect the two in such a manner as to be parallel with the pencil bar, the combination would form an exact pantograph. The slot and roller serve the purpose of this imaginary link; the connection between the piston and the pencil mechanism is made by means of a steel piston rod. At the upper end, where it passes through the cover, it is hollow, and has an outside diameter measuring $\frac{3}{16}$ of an inch. At the lower end it is solid, and its diameter is reduced. It connects with the piston through a ball and socket joint. The socket forms an independent piece, which fits into a square hole in the center of the piston, and is fastened by means of a central stem provided with a screw, which passes through the hole and receives a nut applied from the under side. The nut has a flat-sided head, so as to be readily operated with the fingers. A number of shallow grooves are cut upon the outside of the piston to serve as a so-called water packing.

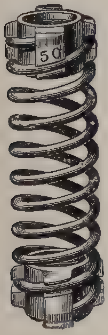
One of the most important features of an indicator is its *parallel motion*. The correctness of the parallel motion of the Tabor Indicator is such that at all times, and at every point on the diagram within the reach of the pencil point, the extreme end of the pencil bar will record a vertical travel or movement of just five times that of the indicator piston, which can be tested and proved, to the satisfaction of anyone desiring proof, by the use of a micrometer screw device, which we will loan to anyone who may desire to make a test of the instrument.

The *springs* used are of the Duplex type, made of two spiral coils of wire, strongly held at their ends in brass fittings. The wires are so mounted that the ends of each coil are connected on opposite sides of the fitting. This arrangement equalizes side strain on the spring, and ensures the piston moving central in the cylinder, thus avoiding excessive friction caused by a single coil spring, in forcing the piston against the side of the cylinder. The threads by which the spring is connected are cut on the inside of its fittings, and suitable threaded projections on the under side of the cover and on the upper side of the piston, respectively, are provided for securing the spring in place. These springs are adjusted under steam pressure, and are, consequently, correct only when used with steam. If required for water, or other purposes, it should be so stated in order. It should be borne in mind that a spring is liable to become impaired by continued use, and for important work its accuracy should always be tested beforehand.

TABOR STEAM ENGINE INDICATORS

DESCRIPTION—CONTINUED

The maximum safe steam pressures above atmosphere, to which the various springs made for the Indicator can be subjected, are given in the following table:



DUPLEX SPRING

Scale of Spring	Safe Maximum Pressure Lbs. Pressure per Sq. In.		Scale of Spring	Lbs. Pressure per Sq. In.	
	To 200 Rev.	To 300 Rev.		To 200 Rev.	To 300 Rev.
8	10	6	48	112	95
10	15	10	50	120	100
12	20	15	60	140	115
16	28	22	64	152	125
20	40	32	80	180	145
24	48	40	100	200	160
30	70	58	120	240	195
32	75	62	150	290	250
40	95	80	200	375	330

The *paper drum* turns on a vertical steel shaft, secured at the lower end to the frame of the Indicator. This drum is supported at the bottom by a carriage, which has a long vertical bearing on the shaft. It is guided at the top by the same shaft, which is lengthened for this purpose, the drum being closed in at the top and provided with a central bearing. The drum is held in place by a close fit, in the usual manner, and is easily removed by the hand when desired. Stops are provided on the inside of the drum at the bottom, with openings in the outside of the carriage to correspond, so as to prevent the drum from slipping. These are so placed that the position of the drum may be changed so as to take diagrams in the reverse position of the pencil mechanism, when so desired. The drum is made of thin brass tubing, so as to be extremely light. Suitable strength is obtained by leaving a ring of thicker metal at the bottom and by employing the closed top. Spring clips are attached to the drum for holding the paper.

The *drum carriage* projects below the lower end of the drum, where it is provided with a groove for the reception of the driving cord. This groove has sufficient width for two complete turns of the cord. The drum spring, by which the backward movement of the drum is accomplished, consists of a flat spiral spring of the watch spring type, placed in a cavity under the drum carriage encircling the bearing. It is attached at one end to the frame below, and at the other end to the drum carriage. In its normal position the drum carriage is kept against a stop by means of the pull of the spring. The lower hub of the drum carriage rests directly on the spring case, while the opposite hub is in contact with a knurled thumb nut screwed and pinned to the central drum shaft. This thumb nut serves as a convenient means for winding or unwinding the paper drum spring, as by loosening the thin hexagon nut on the underside of the arm to which the spring case is secured by it, the thumb nut can then be turned in either direction until just the desired tension of the spring is obtained, when the thin nut should again be firmly tightened.

A simple form of *carrier pulley* serves to guide the driving cord on to the drum from any direction. A single pulley is mounted within a circular perpendicular plate, and the hole in the center of which coincides with the center of the driving cord with the

TABOR STEAM ENGINE INDICATORS

DESCRIPTION—CONTINUED

periphery of the pulley. The plate can be turned about its center so as to swing the pulley into any desired angular position, and thereby lead the cord off in any desired direction. The plate is held by a circular frame, which serves also as a clamp, and the pulley is fixed in position by the use of the same nut which secures the frame to the pulley arm.

The instrument is *attached* by means of a coupling having but one thread. It is simple, like a common pipe coupling, and is operated by simply turning it in the proper direction, without exercising that care which the use of couplings having double threads require. The indicator cock is provided with a stop so as to turn only the 90 degrees needed for opening and shutting. A complete revolution of the cock is impossible.

The *pressure of the pencil* on the paper drum is regulated by means of a screw, which passes through a projection on the slot plate, and strikes against a small stop provided for the purpose, and secured to the frame. This screw is operated by a handle of sufficient size to be readily worked by the fingers, which also serves as a handle for turning the pencil mechanism back and forth, as is done in the act of taking diagrams. The screw, with handle, may be introduced and worked from either side, so as to use the pencil mechanism on either side of the paper drum.

The *end of the pencil bar* is shaped in the form of a thin tube for the reception of the pencil lead or metallic marking point. The tube is split apart on the side and yields to the slight pressure required to introduce the pencil, from either side, so as to mark on either side of the paper drum desired. The outside of the instrument in all its parts, excepting the pencil bar and links composing the pencil mechanism, is nickel-plated. The pencil mechanism is made of steel, hardened, and drawn to a spring temper, with blue finish.

Some of the dimensions of the parts in the instrument are as follows: Diameter of piston, 0.7978 inch; diameter of paper drum, 2.063 inches; stroke of paper drum, 5.5 inches; height of paper drum, 4. inches; diameter of wire used in 40 spring, 0.073 inch; number of times pencil mechanism multiplies piston motion, 5.; range of motion of pencil, 3.25 inches.

The excellence of manufacture of the parts of the Tabor Indicator is a marked feature in the instrument, and particular attention is directed to this matter, as, from an engineering point of view, excellent workmanship in an instrument of this kind is of great importance. The perfection which is reached in its mechanical construction is revealed not only by a general examination of one of these instruments, but by a close inspection of every part; another point, and one that is usually overlooked, although of the highest importance, is, *that the movement of the pencil should coincide exactly with the movement of the piston. The difficulty with all pencil movements on indicators is not to make the pencil point move in a perfectly straight line, but to make the pencil move exactly so many times (five in this case) as fast as the piston at every part of its range. This has been perfectly accomplished in the Tabor Indicator.* A result of the care in designing and constructing these instruments is a reduction of friction to the least possible amount. In a late report of a test of indicators made at the Brookly Navy Yard, it was stated that the Tabor Indicator had 30 per cent. less weight of moving parts and 24.3 per cent. less friction than any others tested.

TABOR STEAM ENGINE INDICATORS

With Houghtaling Reducing Motion

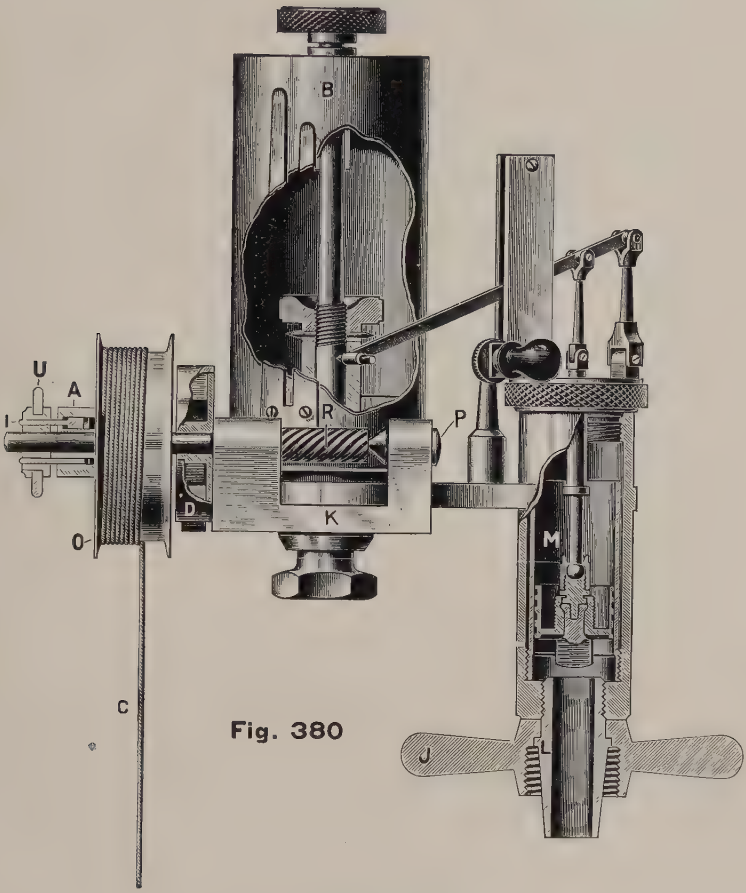


Fig. 380

PRICES

Tabor Indicator, as shown, fully nickel-plated, with one cylinder spring, one boxwood scale, two straight cocks, 100 cards, two screw drivers, one bottle porpoise oil, two wrenches, one extra drum spring, all enclosed in a substantial, well-finished black walnut box, with nickel-plated trimmings Each $115.

One three-way cock, in place of two straight cocks, will be furnished without extra charge, if called for.

With each outfit of Indicators we furnish, without charge, Houghtaling's book on the *Steam Engine Indicator and its Appliances*, a valuable publication of 300 pages, describing the operation of the Indicator on all classes of engines.

For prices of parts and extras, see page 117.

TABOR STEAM ENGINE INDICATORS

With Houghtaling Reducing Motion

DESCRIPTION

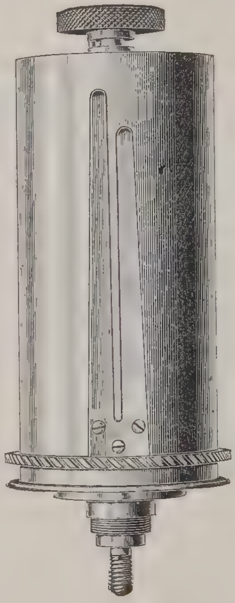


Fig. 380A

This patent *reducing motion* is composed of a supporting base piece, K, provided with short standards that form bearings for the worm shaft, R, on which the flange pulley, O, is rotated, the outer bearing being a pivot, P, which receives the entire thrust of the shaft, R, thus reducing the friction to a minimum. It is connected direct to the Indicator upon the projecting arm that supports the paper drum, B, and the teeth of the worm shaft, R, mesh directly into the teeth on the drum carriage. [Figure 380—A shows paper drum and the drum carriage with teeth cut thereon.] Connected with the base piece, K, is a spring case, D, and on the extreme end of the worm shaft, R, is secured a clutch consisting of a collar, A, through which the clutch pin, I, fastened to the flange holding swivel collar, U, slides freely.

The *flanged pulley*, O, runs freely and independently on worm shaft, R, and has on its outside a clutch-shaped hub. To this pulley, O, is connected the actuating cord, which should encircle it a sufficient number of times to have its length, when unwound, a little more than equal the length of the stroke of the engine. The other end of the cord is secured either to the cross head of the engine, to a standard bolted thereto, or to any moving part that has an exact similar motion, and must be connected in line from the pulley, O.

Enclosed in the *spring case*, D, is a small, plain spiral steel spring which operates solely to return the pulley, O, back to its starting point, after it has been revolved in one direction by the forward movement of the engine cross head. As this pulley, O, has an independent, rotating back-and-forth motion on the worm shaft, R, the necessity of unhooking the cord when the Indicator is not being operated is entirely overcome. The paper drum, B, is rotated forward by means of the pulley, O, through its worm shaft, R, engaging with the worm gear, on the paper drum carriage, and in the opposite direction, or backward, by the action of its own retracting spring. On top of paper drum, B, is a knurled thumb piece made with a projecting pin on its under side to engage with a similar pin located in the top of the drum, and is to be used by the operator for moving the paper drum slightly forward preparatory to taking a diagram, to prevent the drum from striking against its stop on the return motion.

With the indicator we furnish for use on the reducing motion, three different sized pulleys, which are of one-inch, two-inch and three and one-half inches diameter. These pulleys are sufficient for use in taking diagrams from engines having length strokes from six inches to four feet. Other sized pulleys can be furnished when required.

TABOR STEAM ENGINE INDICATORS

With Houghtaling Reducing Motion

TO OPERATE

To operate this device, first select a pulley whose diameter is about one-twelfth of the length of the engine stroke in inches. See table below.

To properly place this pulley upon the worm shaft R, first remove the clutch, and then slide the pulley on to the shaft, being particular that the small hole in the pulley brass disc sets over the projecting pin in the cover of the spring case D. Then replace the clutch by pushing it on to the shaft as far as it will go, and secure it there by means of the set screw.

Next, place the Indicator on the engine in such a position that the side of the pulley will be parallel with the motion of the cross-head. Run out the loose end of the cord to a distance of at least 12 or 18 inches *beyond the extreme forward travel* of the cross-head, still leaving a turn or two of the cord on the pulley unwound. While holding the cord, allow it to gradually recede and rewind itself on the pulley until its loose end has reached a point coincident with the extreme backward travel of the cross-head. If only a slight tension of the cord exists at this point it will be sufficient, and the cord may then be attached to the selected point on the cross-head. The cord tension may always be adjusted either by winding the cord on, or unwinding it from the pulley, as the case requires, one increasing and the other decreasing the tension.

A much lighter cord can be used in proportion as the sizes of the pulleys increase.

When the *cross-head*, with cord connected, is at its extreme forward travel, there should be just sufficient tension on the spring enclosed in the spring case D to take up all slackness of the cord when running, without overtaxing the spring. If upon starting the engine, the cord should at first run unevenly on the pulley O, turn the Indicator to one side slightly, until a perfect and uniform winding of the cord is obtained, which can always be easily secured. When pulley O is running, motion to the paper drum B is obtained by pushing in the swivel collar U, to which the clutch pin is secured.

When ready to take diagrams, after placing the paper on the drum B, it is necessary first to advance the drum away from its stop fully one-quarter inch, which can be done by turning with one hand the knurled top thumb piece. While holding drum in this position, with the other hand push in gently the swivel collar U to start the paper drum in motion. The motion of the paper drum B can, at any time, be stopped, for removing diagrams taken, and renewing the paper, by withdrawing swivel collar U, or by turning top thumb piece, the latter method being preferable. The stopping of the paper drum will not affect the motion of the pulley O, which will continue to revolve independently while the engine is in motion until the cord is disconnected.

Table of the sizes of pulleys required for use on above style Indicator, for piston strokes of various lengths.

LENGTH OF STROKE	DIAMETER OF PULLEY	LENGTH OF STROKE	DIAMETER OF PULLEY
1 Foot	1 Inch	4 Feet	4 Inches
1½ Feet	1½ Inches	4½ "	4½ "
2 "	2 "	5 "	5 "
2½ "	2½ "	5½ "	5½ "
3 "	3 "	6 "	6 "
3½ "	3½ "		

TABOR STEAM ENGINE INDICATORS

With Small Drums

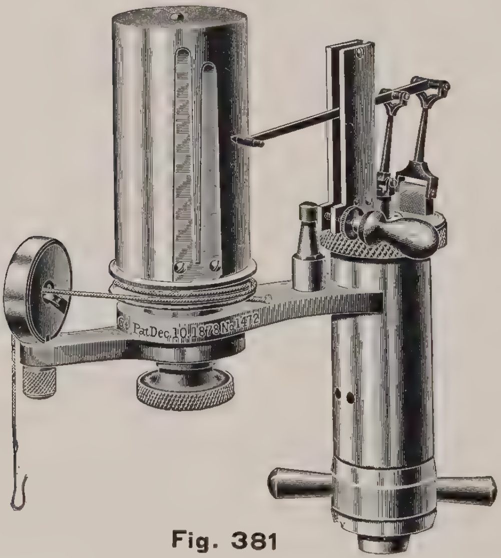


Fig. 381

PRICES

Tabor Indicator, as shown, fully nickel plated, with 1½-inch diameter drum, one cylinder spring, one boxwood scale, two straight cocks, 100 cards, two screw-drivers, one bottle porpoise oil, two wrenches, one extra drum spring, all enclosed in a substantial, well-finished black walnut box, with nickel-plated trimmings . . . . . each, $85.00

Tabor Indicator, as above, with Houghtaling Reducing Motion, as shown in figure 380. . . . . each, $115.00

One three-way cock, in place of two straight cocks, will be furnished, without extra charge, if called for.

With each outfit of Indicators we furnish, without charge, Houghtaling's book on the *Steam Engine Indicator and its Appliances*, a valuable publication of 300 pages, describing the operation of the Indicator on all classes of engines.

For prices of parts and extras, see page 117.

TABOR STEAM ENGINE INDICATORS

With Small Drums

GENERAL DESCRIPTION

To meet the requirements for use on *excessive* high speeds, of a small, compact, reliable Indicator with smaller paper drum, and less range of pencil movement, so as to reduce the effects of the momentum of its rapidly moving parts to a minimum, we have designed, and now manufacture, this small-sized Tabor Steam Engine Indicator, Fig. 381. It is the same in construction, finish, and general appearance as the instrument shown in Fig. 379, but of a *reduced size.* The diameter of its piston, and the multiplication of its pencil movement, 5 to 1, are the same as in the larger indicator, but the travel of the piston is less, and the paper drum is only 1½ inches in diameter by 2⅞ inches high. The body of the Indicator is also reduced in length, which lessens the total weight of the complete instrument and adds to its symmetrical design.

We also make this Indicator complete with the Houghtaling Reducing Motion, as shown in Fig. 380.

TABOR STEAM ENGINE INDICATORS

The Edward P. Allis Company

MILWAUKEE, Wis., December 21, 1898.

ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: We have used a considerable number of your Tabor Indicators, and have in every instance found them entirely satisfactory. Part ot the Instruments have been fitted with your reducing motion, which has in every case proven itself to be a satisfactory device.

Yours truly,
(Signed) IRVING H. REYNOLDS.

Atlas Cement Company

NORTHAMPTON, Pa., December 13, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: Your favor of the 6th inst. at hand, and in reply would say that we have several of your Indicators at use in our mills; in fact, we use nothing else. We consider them an extremely trustworthy instrument, and one requiring but slight repair. The Houghtaling Reducing Motion attached to some of the Indicators in use by us has proven extremely satisfactory.

Yours very truly,
(Signed) H. J. SEAMAN, Superintendent.

Ontario Association Stationary Engineers

TORONTO, February 18, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: I have purchased several Improved Tabor Indicators, with Houghtaling Reducing Motion, from you, and I have much pleasure in saying that I have found this instrument the most complete and handy of any that I have used, and I have had experience with all the better class of Steam Engine Indicators during the past twelve years.

Trusting that this instrument may have the very large sale which its many good points merit, I remain,

Yours very truly,
(Signed) ALBERT E. EDKINS.

The Toledo Carriage Woodwork Company

TOLEDO, Ohio, May 5, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Dear Sirs: We wish to thank you for the very polite and careful manner in which you instruct us not only in the use of the Tabor Indicator, but also for your analysis of the first card we took off after receiving the Indicator, especially your reading of the mean effective pressure by the Coffin averager.

The Tabor Indicator, with Houghtaling Reducing Motion and Attachments, sent us, is entirely satisfactory to us, also the ease with which we are able to attach and operate it, particularly as we have had no previous experience in this line of work, having seen but one indicator card taken off before we experimented with your indicator ourselves.

Yours very truly,
(Signed) C. A. RUSSELL.

TABOR STEAM ENGINE INDICATORS

S. S. "Kongbeng," S. O. S. Co., Ltd.

HONG KONG, CHINA, December 5, 1897.

THE ASHCROFT MANUFACTURING CO.
NEW YORK.

Sir :—I have secured one of your Indicators, No. 3231, new (in fact, was never unpacked). I am very well pleased with the instrument. The diagrams are simply perfect, and I shall do my best to recommend them to the engineers of this Company. Yours very truly,

(Signed) GEORGE I. RUSSELL, Chief Engineer.

Sibley College, Cornell University

ITHACA, N. Y., September 1, 1887.

ASHCROFT MANUFACTURING CO.
NEW YORK.

Gentlemen :—Yours of the 25th, asking a statement in regard to the work of the Tabor Indicators which have been supplied to the Sibley College of Cornell University is received.

It gives me pleasure to be able to say that those instruments have been of *great value to us*, in some of our work of investigation, as well as in the *instruction of students*. They have been used in some of the most *important work done in the laboratories of the college*, and have given *perfect satisfaction*. They proved to be *well made* and *accurately standardized*, and were *beautifully finished*. They are an exceedingly useful and valuable addition to our collection of such instruments. Very truly yours,

(Signed) R. A. THURSTON, Director.

Ball Engine Company

ERIE, PA.

THE ASHCROFT MANUFACTURING CO.
NEW YORK.

Gentlemen :—We are still using the Tabor Indicator purchased of you. Most of our work is high speed from 300 to 350 revolutions per minute. With these conditions we are able to get very satisfactory results which certainly speaks well for the Indicator.

We are friends of the Tabor instrument.

Yours truly,
(Signed) F. H. BALL, Tr.

McIntosh, Seymour & Co.

AUBURN, N. Y., August 30, 1887.

THE ASHCROFT MANUFACTURING CO.
NEW YORK.

Gentlemen :—Yours of the 29th at hand. We use the Improved Tabor Indicator in testing all our engines, and within the range of our experience—up to 400 revolutions—have found it perfectly satisfactory. We obtain very perfect cards at speeds which render the cards of other indicators, which we have tried, almost unintelligible. Yours truly,

MCINTOSH, SEYMOUR & CO.

TABOR STEAM ENGINE INDICATORS

Navy Pattern

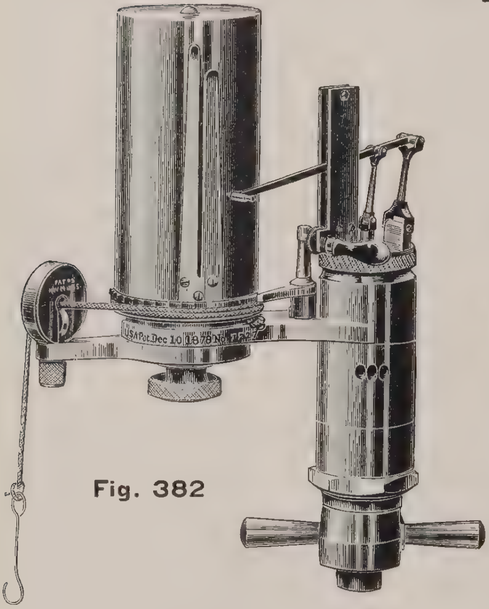

USA Pat.Dec.10 1878 No.

Fig. 382

Standard Size Indicator

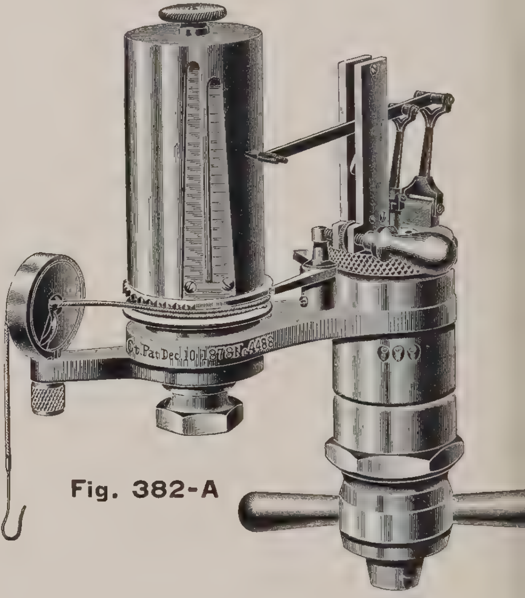


Fig. 382-A

Small Drum Indicator

In our special Navy Pattern Indicator, which is used extensively in the United States, English, Russian, and Japanese navies, we employ an improved device, by which the escaping steam from the Indicator can be discharged away from the operator in any desired direction. This improved device consists of a chambered swivel ring fitting loosely around the body of the instrument into which, by means of holes drilled through the top, the steam that passes by the piston escapes. This ring has a series of holes drilled through it for the final escape of the steam to the atmosphere.

The special Navy Pattern Indicator, Fig. 382, is used on the main engines of battleships, cruisers, monitors, etc., and has paper drum two and one-thirty-second inches in diameter.

Fig. 382-A illustrates a smaller-sized special Navy Pattern Indicator, in which are embodied all the qualities and improved features of the Indicator shown in Fig. 382. The paper drum on this Indicator is one and one-half inch diameter and two and seven eighths inches high, and the reduced size enables it to be used in smaller space than is required for the larger instrument and for the highest speeds. This instrument is used largely on torpedo boats.

Either one of these instruments can be furnished complete with the Houghtaling Reducing Motion (see Fig. 380) if so called for in order.

Prices on application.

TABOR STEAM ENGINE INDICATORS

Navy Pattern

The William Cramp & Sons Ship and Engine Building Co.

PHILADELPHIA, January 20, 1899.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : The Tabor Steam Engine Indicator, as made by your Company, has been exclusively used by us for years past in determining the horse-power of our different ships, with very satisfactory results, and in the official trial trips of many of the ships which we have built for the United States Navy (the successful outcome of which depended upon the horse-power developed) the Tabor Indicator was used by us in determining the results.

Yours truly,
(Signed) EDWIN S. CRAMP, Superintending Engineer.

Newport News Shipbuilding and Dry Dock Co.

NO. 1 BROADWAY, NEW YORK, January 3, 1899.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Dear Sirs : Among the marine engine appliances which have, in our experience, given excellent satisfaction, is the Tabor Indicator, and we desire to record our high opinion of its merits.

A better Indicator may be produced in the future, but the chances are it will bear the name of Ashcroft.

With best wishes for your continued success, we remain,

Very truly yours,
(Signed) C. B. ORCUTT, President.

The Columbian Iron Works and Dry Dock Co.
OF BALTIMORE CITY

BALTIMORE, MD., December 10, 1898.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : In reply to your inquiry, we have used Tabor Steam Engine Indicators for pressures and speeds up to 260 pounds per square inch and 410 revolutions per minute respectively. We would have no hesitation in using them for greater speeds or higher pressures.

You supplied us Tabor Indicators for U. S. Cruisers Nos. 9 and 10, "Montgomery" and "Detroit"; U. S. Torpedo Boats Nos. 3, 4 and 5, "Foote," "Rodgers," and "Winslow"; also for U. S. Torpedo Boat No. 18, "McKee," on all of which they gave entire satisfaction.

Yours respectfully,
(Signed) WM. T. MALSTER, President.

TABOR COMBINED STEAM AND GAS ENGINE INDICATORS

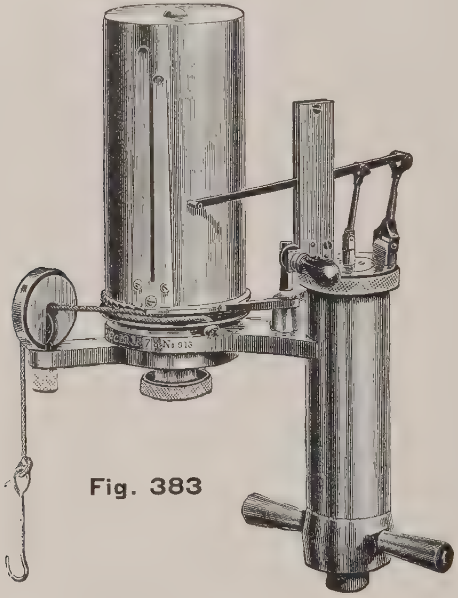


Fig. 383

PRICES

Tabor Indicator, as above, fully nickeled, with one $\frac{1}{4}$-in. area and one $\frac{1}{2}$-in. area piston, one cylinder spring, one box-wood scale, two straight cocks, 100 cards, one screw driver, one bottle of porpoise oil, two wrenches, one extra drum spring, all enclosed in a substantial and nicely polished, black walnut box, with nickel plated trimmings. Each, $100.

One three-way cock in place of the two straight ones will be furnished without extra charge if called for.

With each outfit of Indicators we furnish, without charge, *Houghtaling's* book on the *Steam Engine Indicator and its Appliances*, a valuable publication of 300 pages describing the operation of the Indicator on all classes of engines.

For prices of parts and extras, see page 117.

DESCRIPTION

The increasing use of Gas Engines operated under high initial pressures has necessitated a change in the construction of the Steam Engine Indicator as made for the ordinary steam pressures, so that it can also be used with equal facility for the reliable indicating of such special high-pressure engines.

This new requirement is provided for in the Tabor Combined Steam and Gas Engine Indicator by the addition to the Standard Tabor Indicator of an extra but smaller piston of $\frac{1}{4}$-inch area, operating in a secondary inside cylinder "C" located below the regular cylinder containing the usual $\frac{1}{2}$-inch area piston. Either piston desired can be used in the Indicator, and it can be easily and quickly substituted for the other without disturbing the spring.

TABOR COMBINED STEAM AND GAS ENGINE INDICATORS

DESCRIPTION—Continued

The springs for this Improved Indicator are the same as for our regular Standard Indicators, and are interchangeable with the two different sizes of pistons. When the Indicator is equipped with the ¼-inch area piston, its springs have a maximum pressure limit of twice the pressures allowed for them on a piston of ½-inch area, as stated in the table on page 95. For example: A 40-pound spring having a maximum pressure limit of 95 pounds, with a ½-inch area piston, can be used for a maximum pressure limit of 190 pounds to the square inch with a ¼-inch area piston, and from which it will be observed that this Combined Steam and Gas Engine Indicator has double the range of pressure use with any one spring that the Standard Tabor Steam Engine Indicator, Fig 379, has with the same spring.

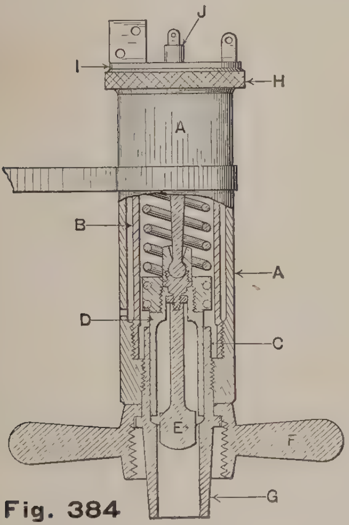


Fig. 384

By reference to Fig. 384 the interior construction of the steam cylinder part of our Combined Steam and Gas Engine Indicator will be easily understood. "A" is the cylinder proper; "B" is the inside cylinder for holding the ½-inch area piston; "C" is the secondary inside cylinder for the ¼-inch area piston; "D" is the ¼-inch area piston, which is made sufficiently long to be well and truly guided in its cylinder "C"; "E" is the thumb nut screw threaded on its top end, for connecting either piston to the piston rod; "F" is the usual cock connection by which the indicator is connected; and "H," "I" and "J" are the cylinder cap, swivel plate, and piston rod respectively.

These Indicators can be furnished complete with the Houghtaling Reducing Motion, as illustrated on page 97, if called for in order.

Armington & Sims Engine Co.

Providence, R. I., Aug. 17, 1888.

The Ashcroft Manufacturing Co.
New York

Gentlemen: Your letter received. Our experience with the Tabor Indicator has been satisfactory. We ordered one of your first Indicators to test our 12 x 12 engine running 312 revolutions per minute. This was the first engine we built for Mr. Edison. It was sent to the Paris Electrical Exhibition with his large dynamo. We have built over 625 engines for him since. We used *every Indicator in the market at that time, and all failed to produce a satisfactory card at 350 revolutions, except the Tabor. To that instrument is our success in a measure due.* We have now four Tabor Indicators, and you have our order for one pair to be sent to England. Respectfully yours,

(Signed) Gardiner C. Sims, Superintendent.

THE TABOR ENGINE INDICATOR

For Use With Ammonia Gas Pressures

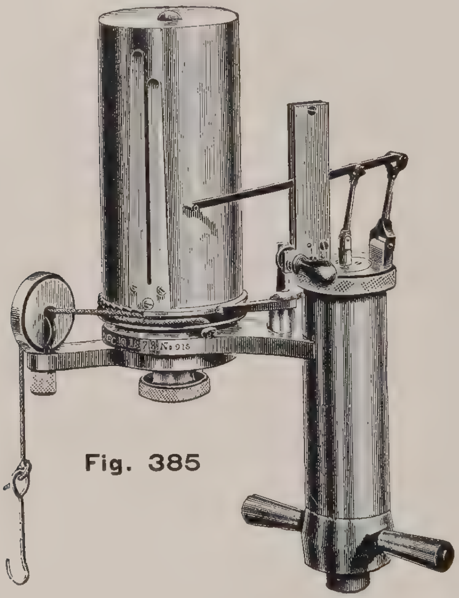


Fig. 385

PRICES

Tabor Indicator, as above, fully nickeled, with one cylinder spring, one boxwood scale, two straight cocks, 100 cards, one screw-driver, one bottle of porpoise oil, two wrenches, one extra drum spring, all enclosed in a substantial, well-finished black walnut box, with nickel-plated trimmings . . . . each, $125.00

With each outfit of Indicators we furnish, without charge, *Houghtaling's* book on the *Steam Engine Indicator and its Appliances*, a valuable publication describing the operation of the Indicator on all classes of engines.

For prices of parts and extras, see page 117.

DESCRIPTION

These Indicators are adapted for use on ice and refrigerating machinery. All their parts that are liable to be affected or injured by the action of the ammonia gasses are made of steel.

They can be furnished complete with the Houghtaling Reducing Motion, as illustrated on page 97, if so called for in order.

TABOR STEAM ENGINE INDICATORS

Westinghouse, Church, Kerr & Co.

NEW YORK, U. S. A., August 26, 1887.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : Replying to your favor of the 25th, would say that we are pleased to state the satisfaction which we have obtained from the use of the Tabor Engine Indicator.

Our engine probably places upon an Indicator the most difficult conditions for obtaining accurate cards of any engine regularly manufactured in this country, owing to the high rotative speed which taxes both the piston and drum movement of the Indicator to its utmost. We have had experience with about all styles of Indicators, and the result is that we use the Tabor exclusively with our engines, and, of course, the instrument which we find best for fast running must certainly be equally good for slow speeds. We therefore do not hesitate to express a positive preference in the matter.

We have frequently noticed that an Indicator which may give a good looking card does not necessarily give an accurate one, and this accuracy may be checked in various ways wholly outside of the use of the Indicator itself. It is sometimes easier to get a good looking card from a fast running engine than one which truly represents what is taking place within the cylinder, and we believe that the Tabor Indicator gives us a closer indication of the action of the steam in all its functions than any other we have used, and therefore what we have to say in favor of the instrument is not based on general preference, but specific results. Very truly,

(Signed) WALTER C. KERR.

Westinghouse Machine Co.

PITTSBURG, January 4, 1886.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : Yours of December 24 received and noted. In reply would say that we have used *The New Tabor Indicator almost daily since it was sent to us*, and we find it to be in all respects the most satisfactory instrument of the kind that we have ever used. The speed of the engine on which it had been used is a little more than 300, and its requirements for engines of this class may be considered to have been fairly tested. Yours truly,

(Signed) H. H. WESTINGHOUSE, President.

Engineering Office of Chas. E. Emery

NEW YORK, September 8, 1887.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : Responding to your request, I would state that I have purchased for myself and others *several Tabor Indicators* and I cheerfully bear testimony to the *excellent workmanship* upon them, to the correctness of the principles involved and to the *uniform reliability* and thorough adaptation of the instruments for taking accurate Indicator diagrams at *either high or low speeds.* Very truly yours,

(Signed) CHAS. E. EMERY.

TABOR STEAM ENGINE INDICATORS

fitted with

HOUGHTALING REDUCING MOTION

and

ELECTRIC ATTACHMENT

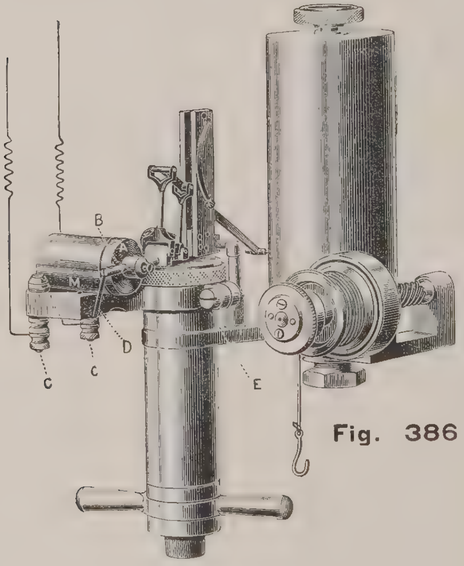


Fig. 386

PRICES

Tabor Indicator, as above, fully nickeled, with one cylinder spring, one boxwood scale, two straight cocks, 100 cards, two screw drivers, one bottle of porpoise oil, two wrenches, one extra drum spring, all enclosed in a substantial well finished black walnut box with nickel plated trimmings . . . . each, $140.00

Tabor Indicator, as above, but without the Houghtaling reducing motion, each, $110.00

One three-way cock in place of the two straight cocks will be furnished, without extra charge, if called for.

With each outfit of Indicators we furnish, without charge, *Houghtaling's* book on the *Steam Engine Indicator and Its Appliances*, a valuable publication of 300 pages, describing the operation of the Indicator on all classes of engines.

For prices of parts and extras, see page 117.

TABOR STEAM ENGINE INDICATORS

DESCRIPTION OF ELECTRIC ATTACHMENT

In making complete and reliable tests of steam power from any and all classes of engines, wherever it is necessary to use two or more Indicators for the purpose, it requires some convenient and rapid means of operating them so that all cards taken at any particular stroke of the engine will commence and leave off in the same interval of time. The cut represents a simple electrical attachment as it is applied to the Tabor Indicator for this purpose to enable the operator to produce diagrams from one or more Indicators simultaneously during the same stroke of the engines, and from any number of cylinders, by simply pressing a button arranged to close the electrical circuit.

The attachment consists of a magnet support, S, which is clamped to the body of the Indicator and held in place by the set screw, E. A magnet, M, is secured to the support, also binding screws C and spring D. An armature, A, is mounted on the rod B, and adjusted to coincide with the magnet M, and then secured to the rod B by the small set screw in the armature for that purpose. The rod B is screwed into the upright on the swivel plate of the Indicator, and any movement of the armature A produces a similar movement of the pencil toward or from the paper drum. The spring D is for the purpose of holding the armature within the field of the magnet before the current is established, and also to quickly release it when the current from the battery is broken.

The improved device is easily attached to or detached from the Indicator in a few seconds. By removing the cap that supports the pencil movement of the Indicator and slackening the set screw E of the support S, the attachment is readily removed. Its connection with the Indicator does not in any way interfere with the usual speedy and convenient means of adjusting the diagram paper to, or removing it from, the paper holding drum, or the changing of a spring in the instrument. It can be used on either right-hand or left-hand Indicators with equal facility by reversing the magnet support S and the magnet M, the latter being secured to its supporting shelf by two small screws. Any one of the well-known batteries in the market (either dry or liquid) will be ample to operate a single Indicator where the circuit is short.

The Taylor Engine Co.

CHAMBERSBURG, Pa., December 2, 1896.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Dear Sirs: We desire to commend you for the very complete equipment sent us in the Tabor Improved Indicator with Houghtaling Reducing Motion. It is certainly a beautiful instrument, and our experience has taught us that there is no better Indicator made than the Tabor. It certainly is a most complete piece of mechanism, and up to date in every respect. We remain,

Truly yours,

THE TAYLOR ENGINE CO.

TABOR STEAM ENGINE INDICATORS
fitted with
DRUM STOP ATTACHMENT

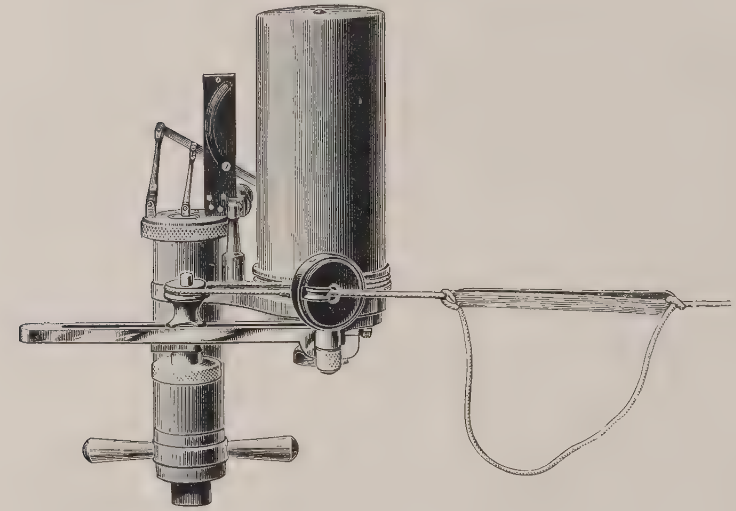


Fig. 387

Price of Drum Stop Attachment, $5.00 Each

DESCRIPTION

This attachment is for the purpose of starting and stopping the Indicator paper drum at all times without unhooking the actuating cord. It consists of an arm attached to a part of the Indicator by a screw. A slide is adjustable on the arm, and upon it is mounted a cord pulley for directing the actuating cord around the paper drum of the Indicator. Said slide can be instantly secured in any desired position on the arm by the thumb nut and washer.

The *manner of connecting* and operating the attachment is as follows: The actuating cord from any ordinary form of reducing motion connected with the engine is passed around the cord pulley, thence on the paper drum of the Indicator. When the slide is at its inner position no motion will be transmitted to the paper drum, but by taking hold of the thumb nut and moving the slide outward on the arm, it will cause the paper drum to rotate back and forth in the usual way while taking a card. At any convenient position on the actuating cord there is superposed a rubber band for the purpose of taking care of any slack in the cord when the slide is at its extreme inner position and paper drum at rest, thus avoiding any unhooking of the actuating cord during the time of operating the Indicator in making tests.

LAZY TONGS OR PANTOGRAPHS

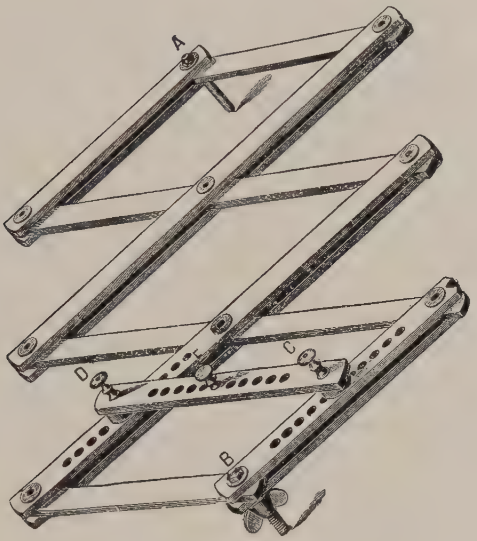


Fig. 388

PRICE $10.00 EACH

There are various devices used to reduce engine strokes to conform to the travel of the drum of an Indicator not equipped with the reducing motion. The above cut, one-sixth actual size, is one of the appliances frequently used to obtain the necessary motion (on a reduced scale) between the paper drum and the engine cross-head. This device is pivoted at the end (B) by a stud and winged thumb nut to a block of wood or angle iron secured to the floor of the engine room, while the end (A) is fitted in a suitable piece secured to the cross-head of the engine. The actuating cord from the Indicator is attached to the cord pin (E) on the cross-bar (C D). This cross-bar may be moved in different positions with relation to the center (B) by changing the screws (C and D), and the cord-pin (E) must always be placed in a line with the centers (A and B). The position of the cross-bar (C D) in relation to (B) determines the length of travel of the cord-pin (E), and consequently the length of the diagram.

This Lazy Tongs can be used to obtain any desired reduction of motion of the engine piston, of various length strokes up to 72 inches.

ASHCROFT REDUCING WHEELS

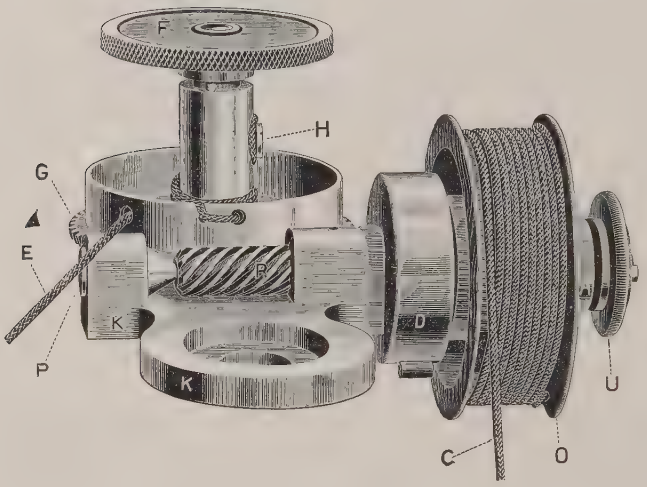


Fig. 389

PRICE, $25.00 Each

To ensure an accurate reduction of the stroke of an engine to the desired length of the Indicator diagram to be taken therefrom, a reliable reducing motion is essential. Various modifications of the pendulum lever, pantographs, and other combinations are employed to accomplish this result, often with accuracy when they are used under favorable conditions. The "wheel" has proved a much more reliable and satisfactory reducing motion than any of the other kinds, and during the last few years it has, to a great extent, superseded all other devices for the same purpose.

The illustration herewith represents an *independent* Reducing Wheel motion of our own design, so made that it can be applied not only to our own Tabor Indicators, but to some of the other Indicators now on the market. Its principle of operation, and instructions for its manipulation when in use, are practically the same as apply to the positive reducing motion forming a part of our Tabor Steam Engine Indicator, as shown in Fig. 380, page 97. This device can be secured directly to an Indicator, or it can be located at any convenient suitable position away from it, and will work satisfactory in either position.

ASHCROFT REDUCING WHEELS

DESCRIPTION

The device consists of a base "K," with two standards for the bearings for the worm shaft "R." The base is extended to provide a support for the worm gear disc "G," to which the cord "E," from the Indicator paper drum, is secured in a manner as illustrated. A pulley "O," of suitable diameter for the stroke of the engine, is loosely mounted on the worm shaft "R," to which pulley one end of the separate driving cord "C" is secured, the other end of the cord being connected either direct to the engine cross-head, to a standard bolted thereto, or to any other part of the engine having a coincident motion. From whatever point selected for attaching the cord, it is necessary that the cord run in a line practically parallel with the travel of the engine cross-head for a distance of at least the length of the engine stroke.

A small flat coil spring, located in the spring case "D," is connected to the pulley "O" by means of a disc (not shown in illustration), for the sole purpose of rewinding upon the pulley the slack cord that would otherwise occur during the inward stroke of the engine. When in operation the entire mechanism is returned to its normal position at the termination of the inner stroke of the engine at each revolution, by the action of the spring inside the paper drum of the Indicator. When ready to operate, and just before engaging the clutch by means of swivel collar "U," the knurled disc on top should be turned around slightly to advance the paper drum of the Indicator sufficiently to avoid the drum striking against its stop upon its return motion.

Reducing pulleys of 1-inch, 2-inch, and 3½-inch diameter are furnished with this Reducing Wheel. Special sizes of pulleys can be made to order.

For particulars of the required size of pulleys for different strokes of engines, see table on page 99.

Straightway Cocks

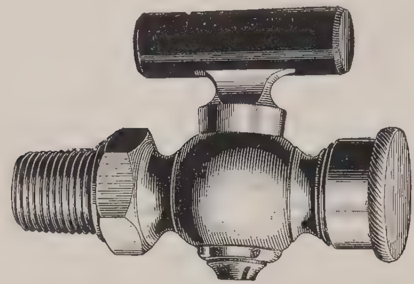


Fig. 390

PRICE . . . . $2.75 each

Three-way Cocks

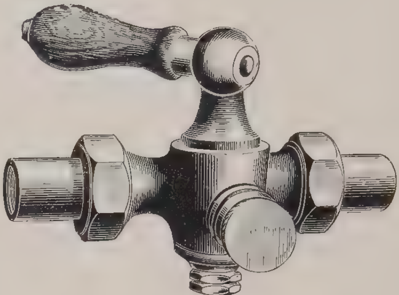


Fig. 391

PRICE, Brass . . . . $6.00 each
" Nickeled . . . . . . 7.00 "

Boxwood Scales

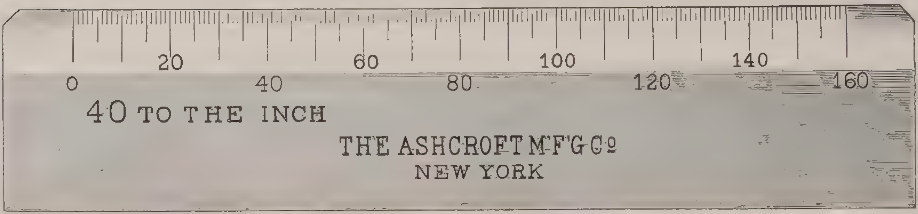


Fig. 392

PRICE . . . . 50 cents each

These Scales are graduated in 8, 10, 12, 15, 16, 20, 24, 30, 32, 40, 48, 50, 60, 64, 80, 100, 120, 150, and 200 parts to the inch, and we also have a full line graduated in millimeters to the French standards.

Cylinder Springs

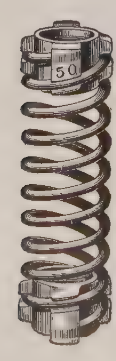


Fig. 393

PRICE . . . . . $5.00 each

Scale of Springs	Maximum safe pressures to which they can be subjected. Lbs. Pressure per Sq. In.	
	To 200 Rev.	To 300 Rev.
8	10	6
10	15	10
12	20	15
16	28	22
20	40	32
24	48	40
30	70	58
32	75	62
40	95	80
48	112	95
50	120	100
60	140	115
64	152	125
80	180	145
100	200	160
120	240	195
150	290	250
200	375	330

Ashcroft Carrying Pulleys

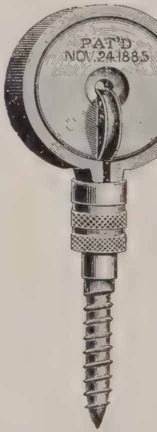


Fig. 394

PRICE . . . . . $2.50 each

TABOR STEAM ENGINE INDICATORS

Prices for Parts and Extras

Steel Scales, 7 graduations	each	$1.50
Nickeled Elbows	"	2.50
Double Carrying Pulleys	"	3.00
Parallel Rule	"	7.00
Metallic Cards	per 100	.75
Plain "	" "	.40
Cord, warranted non-stretchable	per hank	.50
Drum Spring	each	.40
Houghtaling's book on the Steam Engine Indicator and Its Appliances	"	2.00

AMSLER PLANIMETERS

For Measuring the Areas of Cards from Steam Engine Indicators

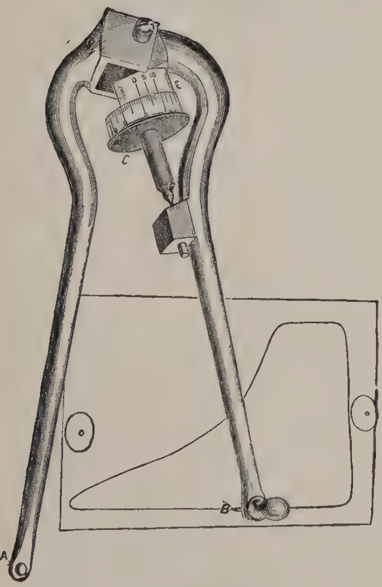


Fig. 395

GENERAL INSTRUCTIONS

It is necessary first to make sure that the instrument is in good condition. The roller-wheel ought to play easily without touching the vernier. The pivots ought to turn very easily, but without dead motion or backlash. The needle point ought to project but very little. The outside edge of the roller-wheel especially is very delicate, and will bear neither the least injury nor spot of rust upon its rolling surface. It is very necessary that the arms and tracer should not be bent, and that, if using No. 3, the sliding bar should be in its proper position. Care should also be taken to have a flat, even surface for the roller-wheel to travel upon.

PRICE . . . . $15.00 each

With Extended Arm

PRICE . . . . $30.00 "

COFFIN AVERAGERS OR PLANIMETERS

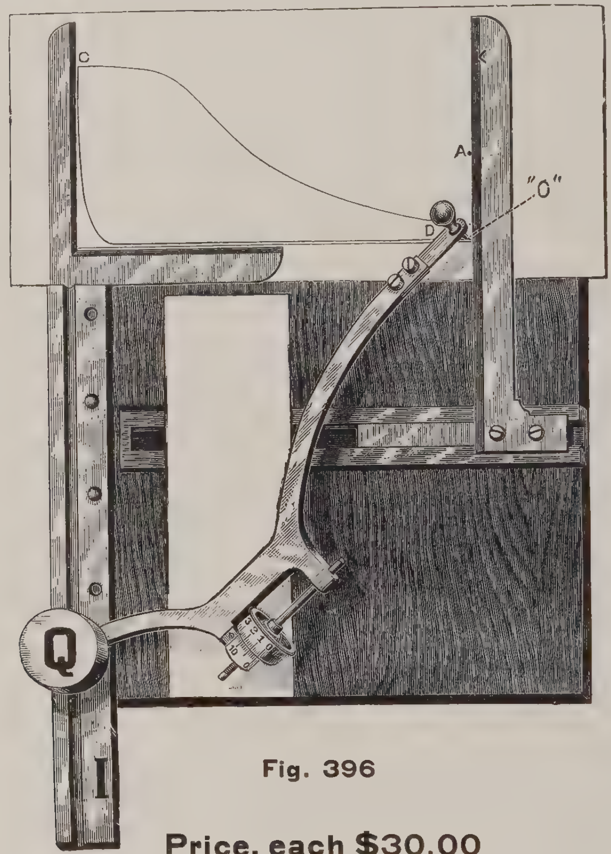


Fig. 396

Price, each $30.00

This instrument is a great saver of time in computing Indicator diagrams, as by its use both the areas and mean effective pressures are reliably and quickly ascertained without any mathematical calculations whatever. It is designed to measure the areas of irregular figures, and is operated by moving a tracer, with which it is fitted, over the line of diagram, recording the area upon a graduated wheel.

In using the Coffin Averager, the grooved metal plate, I, is first connected to the board upon which the apparatus is mounted, in the position shown in the cut, being held in place by a thumbscrew applied from the back side. The indicator card is then placed under the clamps C and K, which may be sprung away from the board a sufficient amount to allow the card to be introduced, and the card is moved toward the left into such a position that the atmospheric line is near to and parallel with the lower edge of the stationary clamp C, while the extreme left-hand end of the diagram is even with the perpendicular edge of the clamp. The movable clamp K, which is fastened at the bottom to a sliding plate, is then moved toward the

COFFIN AVERAGERS OR PLANIMETERS

DESCRIPTION—CONTINUED

left, till the vertical beveled edge just touches the extreme right-hand end of the diagram. The diagram shown in the cut represents the proper location which should exist when these preliminary adjustments have been completed. The slide at the bottom of clamp K fits closely, so that the application of a slight pressure with the thumb or finger is required to displace it.

The beam of the instrument is next placed on the board, with the pin at the lower end resting in the groove I, and the weight Q applied to the top of the pin so as to keep it securely in place. The tracer O is moved to the right-hand end of the diagram and set at the point D, on the line of diagram, where the clamp K and the diagram touch each other. Here a slight indentation is made in the paper by pressing the finger on the top of the tracer, and this serves as a starting point. The graduated wheel is next turned so as to bring its zero mark to the zero mark on the vernier. The instrument is now ready for operation. The tracer O is carefully moved over the line of the diagram, in the direction of motion of the hands of a watch, and continued till a complete circuit is made and the tracer finally reaches the starting point D. Keeping the eye on the wheel, the tracer is now moved upward by sliding it along the edge of the clamp K, until the reading on the wheel returns to zero. Another light indentation is made on the paper to mark the new position which the tracer occupies. This point is represented at A in the cut. The instrument is now moved away, the clamp pushed back, and the distance between the two points D and A is measured with a scale corresponding to the number of the spring used in the Indicator. The distance thus found is the mean effective pressure, expressed in pounds per square inch of piston.

The *Coffin Averager* determines the desired result without computation, but it may be used also for determining the area enclosed by the diagram. This area is given by the reading on the graduated wheel, when the circuit of the diagram has been made and the tracer reaches the starting point, D. The wheel has fifteen main divisions, each of which represents one square inch of area. Each division has five subdivisions, each subdivision representing one-fifth, or two-tenths, of a square inch of area. The vernier scale enables the subdivisions to be read to fiftieths, each of these fiftieths, therefore, representing two one-hundredths of a square inch. Having obtained the area in this manner, the mean effective pressure can be computed therefrom, if desired, by dividing the number of the spring representing the pressure per inch in height by the length of the diagram (inches) and multiply- the quotient by the area (square inches). In first placing the Indicator card under the clamps, care must be taken to have the ends of the diagram set a little away from the edge of the clamp, so as to allow for one-half the diameter of the tracer, and to bring the center of the tracer over the center of the line of the diagram.

COFFIN AVERAGERS OR PLANIMETERS

REPORT OF BOARD OF NAVAL ENGINEERS

The *Coffin Averaging Instrument* furnished with the Tabor Indicator consists of an ordinary Planimeter, so arranged that one end of the radius-bar carrying the graduated wheel is constrained to move in a fixed groove or guide, while the tracer at the other end is being carried over the outline of the diagram to be measured. The grooved guide is secured by means of a thumb screw and two steady pins to a thin board (5¾ by 7⅝) inches fitted with one fixed and one adjustable clamp for holding the paper on which the diagram is traced.

To use the device, the grooved guide is first secured on the left side of the board with the middle of the groove in a line with the edge of the fixed clamp, which is perpendicular to the bottom line of the board; the card is then introduced under the clamps in such a manner as to bring the atmospheric line parallel and the back pressure line to coincide, as nearly as possible, to the lower edge of the fixed clamp, while the left-hand side of the diagram is brought to the perpendicular edge of the same clamp; the adjustable clamp is then moved over the paper until its edge touches the right-hand side of the diagram.

To measure a diagram, a stud in the end of the radius-bar of the Planimeter is inserted in the groove and a small weight applied over it to keep it in place; the tracer is thus brought to the lowest point on the right-hand side of the diagram in contact with the adjustable clamp. The zero on the wheel having been made to correspond with that on the vernier, the tracer is then carried over the diagram in the direction of the hands of a watch to the point of starting. The reading on the wheel will then represent the area of the diagram in square inches. To obtain the mean pressure, the tracer is carried up along the edge of the clamp until the zero on the wheel coincides with the zero on the vernier; the scale of the spring of the Indicator applied to measure the distance between the point of the tracer and the point of starting on the diagram gives, by its reading, the mean pressure in pounds per square inch. Tests were made with the instruments in measuring a number of geometrical figures of different forms and dimensions of known areas, and its accuracy was fully established.

The arrangement is simple and convenient in form, and by its use both time and labor can be saved in computing Indicator diagrams and other irregular figures, *and the Board therefore recommends its purchase for use in the Naval Service.*

COFFIN AVERAGERS OR PLANIMETERS

REPORT OF BOARD OF NAVAL ENGINEERS—CONTINUED

Two scales made by each instrument with the steam rising, and two with the steam falling, together with all the diagrams taken during the trial of the Tabor improved instrument, are herewith forwarded..

Very respectfully, your obedient servants,

(Signed) David Smith,
Chief Engineer, U. S. N.

(Signed) Geo. W. Roche,
Passed Assistant Engineer, U. S. N.

(Signed) J. L. Wood,
Assistant Engineer, U. S. N.

(Signed) Commodore A. A. Semmes, U. S. N.,
Commandant.

Department of Steam Engineering,
Chief Engineer's Office,
October 8, 1884.

U. S. Navy Yard, Washington, D. C.,

(Signed) C. H. Baker,
Chief Engineer.

ASHCROFT OIL TESTING MACHINES

For Testing the Lubricating Properties of Oil

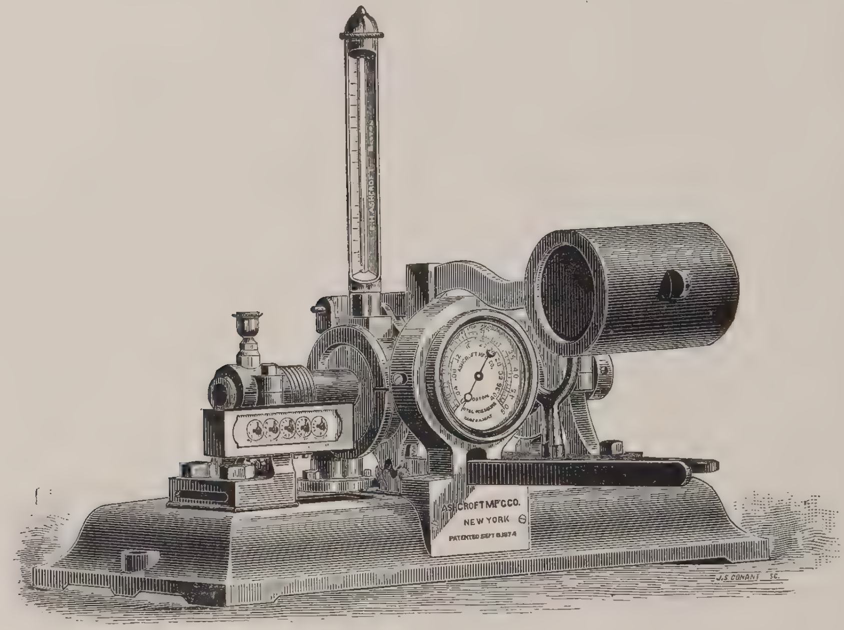

ASHCROFT MF'G CO.
NEW YORK
PATENTED SEPT 8 1874
J.S. CONANT SC.

Fig. 397

PRICE, $150.00 Each

DIRECTIONS

QUANTITY OF OIL TO BE USED IN TESTING

The oil should be measured in a small glass tube or homœopathic bottle. In emptying its contents, the measure should be gently warmed over a flame, to enable the oil to pass freely from it. The measure must be well cleaned out each time. A glass pencil, dipped into the oil and then held until the drops accumulate, will be found useful, but a definite weight or measure is the best. Use 10 drops, more or less, of the oil to be tested, dropped on to the top side of the journal bearing, underneath the brass top cap.

TEMPERATURE AT THE COMMENCEMENT AND EXPIRATION OF EACH EXPERIMENT

The thermometer should always indicate the same temperature at starting. It is found that 160 degrees is the best to try all oils to, if their lubricating power is to be *consumed*, and the machine should always be driven until that temperature is indicated, and then immediately stopped. The machine should be fixed in a place not liable to sudden changes of temperature.

ASHCROFT OIL TESTING MACHINES

DIRECTIONS—CONTINUED

GENERAL INSTRUCTIONS

The top and bottom steps should be well cleaned before each experiment, and kept free from dust. The bearings of the spindle should be well oiled, to prevent friction in the wrong place. *It should run half a day well oiled before a test takes place, when first fixed.*

Graduations on top and bottom levers indicate pressure per square inch on boxes. One of the small sliding weights is to be used for each lever. For 10 pounds pressure per square inch on top journal, hang the small weight in scale pan and attach to the end of lever. For 15 pounds pressure per square inch on top lever, hang the larger weight in scale pan in place of the smaller. In attaching weights to the lever for different pressures, hang them so that their inside face, or face nearest the machine, will coincide with pressure marks on the lever.

THE SPEED OF THE TESTER

When a temperature of 160 degrees has been obtained (the speed index showing zero at the start), the number of revolutions taken to produce the temperature will then be seen. See table below. The speed should be about 1,500. A uniform speed should be maintained in all tests.

TO INDICATE THE FRICTION OF BAD OIL, AFTER BEING USED

After obtaining figures from an oil, stop the machine and let the oil remain on the machine, and in 12 hours after see how soon 200 degrees can be obtained. The second experiment will indicate which oil is the inferior on machinery when stopped.

BAD RESIDUE IN OILS

If oils have once been tested, special tests may be made, or the test continued, to see which oil produces the most offensive residue. This may be done by driving until 200 degrees are obtained.

Each oil should be tested three times, and the total result of them put down. If there is any error, it will be easily seen by too great a discrepancy between each.

The following table may serve as a guide to those using the tester :

QUALITY OF THE OILS	TEMPERATURE PRODUCED	TOTAL INDICATED SPEED OF THREE TESTS	MARKET PRICE PER GALLON AS BOUGHT	REAL VALUE OF THE OILS TAKING NO. 1 AS A STANDARD
No. 1.	160°	120,000	$1.00	$1.00
No. 2.	160°	180,000	.50	1.50
No. 3.	160°	60,000	.30	.50

It will be seen that the No. 2 oil will allow fifty per cent. (50%) more revolutions to be performed than No. 1, and must therefore be worth fifty per cent. more money.

See testimonials published on page 124.

ASHCROFT OIL TESTING MACHINES

University of Michigan

ANN ARBOR, Mich., November 5, 1897.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen : Your favor of October 13, in reference to Oil Testing Machines, has just been handed to me. It evidently encountered delay at our secretary's office.

I am pleased to inform you that we have made almost constant use of the Ashcroft Oil Testing Machine since its purchase in 1891. It has given us good satisfaction, and we are, on the whole, well pleased with it.

Yours very truly,
(Signed) M. E. COOLEY.

Herbert Roberts
MECHANICAL ENGINEER AND RAILWAY SPECIALTIES

DETROIT, Mich., October 25, 1897.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: Yours of the 12th, relative to Oil Testing Machine on the Chicago & Grand Trunk Railway, has been referred to me.

I left the service of that railroad in May last, but, up to that time, we had been using the Machine, as we required to test oils. As a Testing Machine, I consider it does the work satisfactorily, and gives the correct quality of lubricating oils on machinery, etc.

Yours truly,
(Signed) H. ROBERTS.

The Warder, Bushnell & Glessner Company

SPRINGFIELD, Ohio, October 15, 1897.

THE ASHCROFT MANUFACTURING CO.
NEW YORK

Gentlemen: In reply to your favor of the 13th inst., beg to say that the Oil Testing Machine you furnished us in 1886 is still in use, and, while we are not using it every week, we used the Machine quite regularly the first few years, but of late have not had occasion to test oils more than possibly three or four times a year, but are very well pleased with the results obtained. With careful manipulations, we can detect any slight change in the lubricating qualities of oil. We are well pleased with the Machine, and believe an oil tester of some kind is a very desirable apparatus for any concern using lubricating oils.

Very truly yours,
(Signed) CHAS. A. BAUER, General Manager.

ASHCROFT ROTARY OIL PUMPS

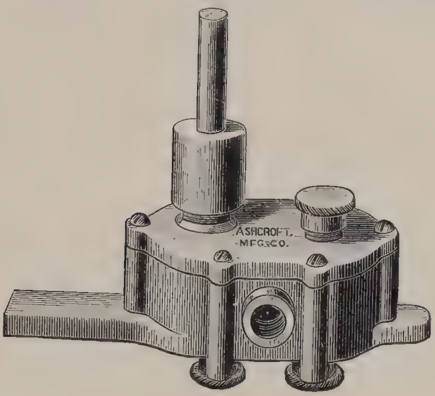


Fig. 398

Price $20.00 each

This Pump is used for drawing and forcing oil, soda water, or other lubricants from a small tank to which it can be attached for supplying a continuous stream to the cutters, drills, or other small tools used in any machine, and it is particularly advantageous where a good and continuous feed of oil or soda water is desired. The lubricant can be used over and over by allowing it to run back into the tank from which the pump draws after it has run off the tools.

FUSIBLE PLUGS

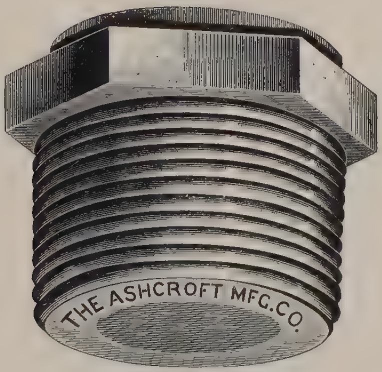


Fig. 399

Prices

⅜ inch	½ inch	¾ inch	1 inch	1¼ inch	size.
30c.	35c.	50c.	75c.	$1.00	each.

ASHCROFT
LOW WATER DETECTORS AND ALARMS

Styles No. 2 and 3 for Vertical Boilers

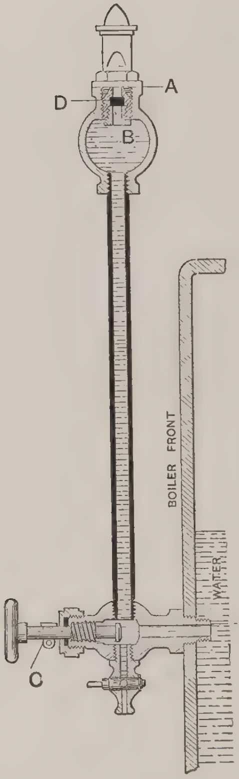


Fig. 400

The operation of this Detector is as follows:

When the water falls below the proper level in the boiler, steam enters the vertical column of the Detector, melting the fusible plug, thus allowing the steam to blow the whistle, which sounds an alarm that there is low water.

DIRECTIONS

After a plug has melted, shut the cock C to stop the whistle blowing. Then pump the water into the boiler up to the proper water line, then unscrew the whistle at A, next unscrew the nut B and put a plug in place, then screw the nut B hard against the plug and replace the whistle, then open the cock C cautiously so as to give the water time to cool before it reaches the plug, and the Detector is again in order.

If water drips from the mouth of the whistle or from the cock, it will cause a circulation in the pipe, which would raise the temperature above 212 degress Fahr., and melt the plug, so care must be taken to screw the nut B hard against the plug, and all joints must be tight.

The cock C should always remain open except when a plug is being renewed, and it can be locked open with a padlock at the will of the owner.

No lead or packing should be used about the plug, which should be blown out at least twice a year.

PRICES

No. 2.	All brass, with 6 plugs	each	$15.00
No. 3.	Iron pipe and ball brass cocks, with 6 plugs	"	12.00
	Extra Discs	per dozen	1.20

ASHCROFT
LOW WATER DETECTORS AND ALARMS

Style No. 1

**FOR
HORIZONTAL
BOILERS**

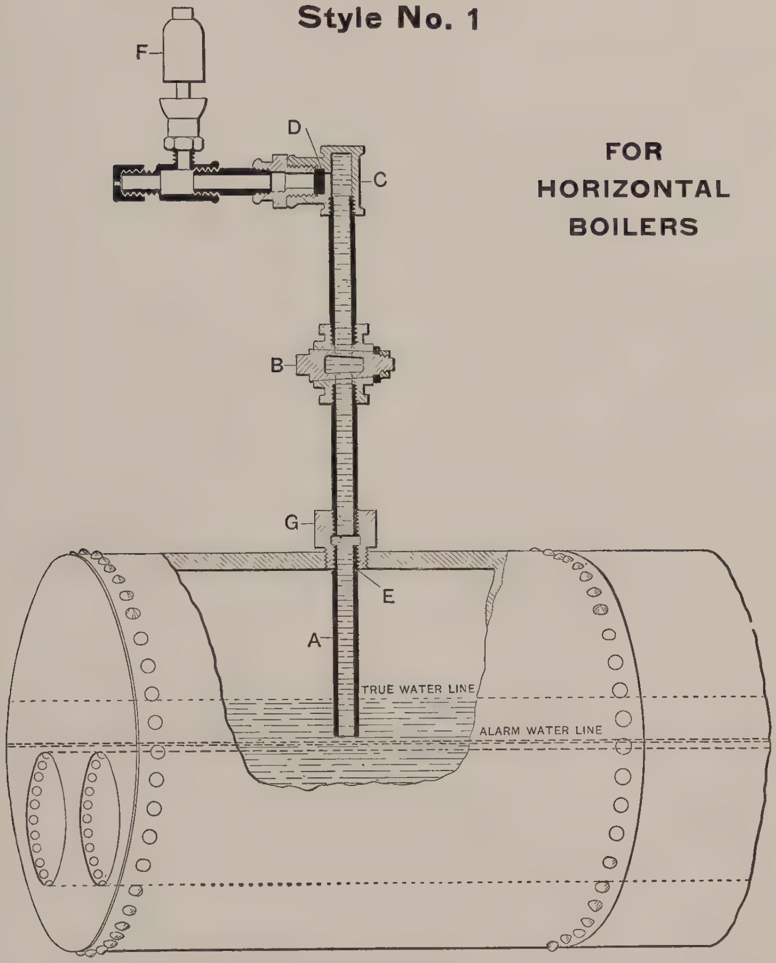


Fig. 401

This Detector operates the same as the one on the opposite page.

DIRECTIONS

After a plug has melted, shut the cock B to stop the whistle blowing, then unscrew the brass coupling which holds the plug in place, insert new plug and replace the coupling, then open the cock B cautiously so as to give the water time to cool before it reaches the plug, and the Detector is again in order.

The pipe A on outside of boiler must be long enough to allow its bottom end to be just above the alarm water line, and the connections, especially at E, must all be tight to prevent circulation of the water.

PRICES

Low Water Detector, with six plugs	each	$15.00
Extra Plugs	per dozen	4.80

ASHCROFT-MARTIN BALANCED FURNACE DOORS AND GRATE BARS

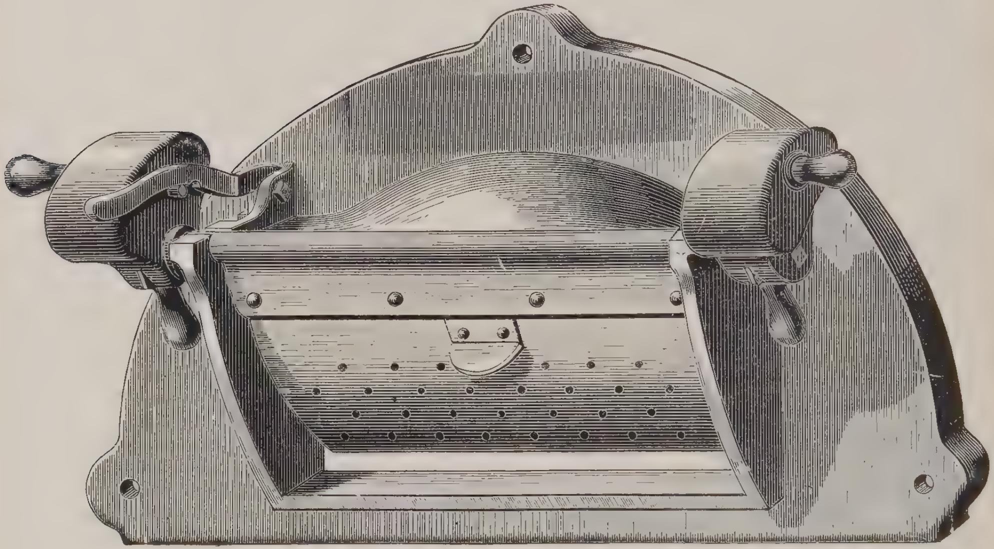


Fig. 402

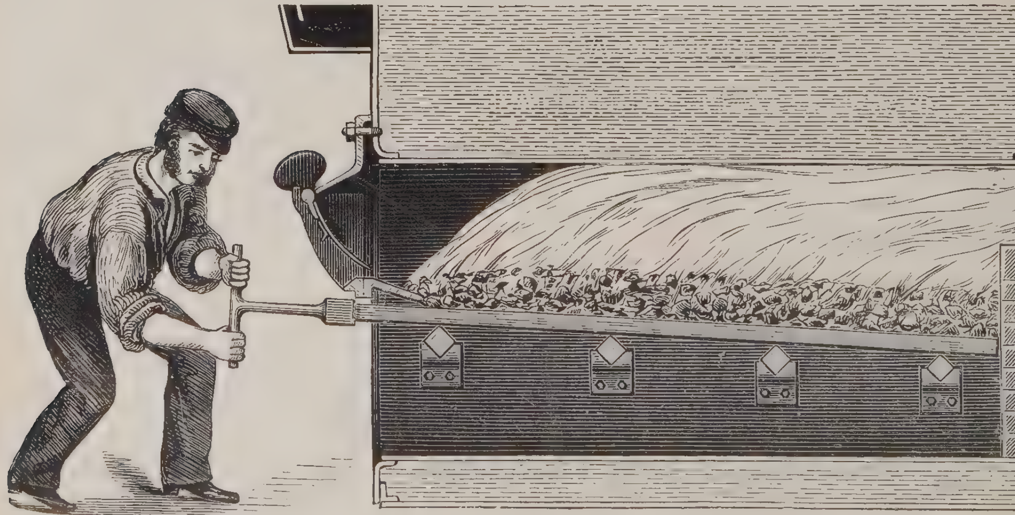


Fig. 403

For description, see opposite page.

ASHCROFT-MARTIN BALANCED FURNACE DOORS AND GRATE BARS

DESCRIPTION

The Fire Bars are plain square wrought iron, and project outside the front of the furnace; each alternate one can be turned round by means of a spanner key, and the whole set can be thus turned in about one minute, freeing the furnace from dross, and clearing the spaces for the admission of air. The furnaces thus fitted will run double the time of ordinary ones without cleaning out.

This combination of the Patent Doors and Bars is such as to allow the freest admission of air *through the fuel*, ensuring the maximum of combustion, and causing a constant current of fresh air in the stoke-hole. The oxygen mixes with the gases in the process of combustion, causing them to become perfectly developed before leaving the furnace, which diminishes the fouling of the tubes, and prevents the possibility of re-ignition taking place in the chimney.

The Patent Balanced Door can be attached to any style of boiler. When ordering, send a rough sketch of boiler fronts, and give dimensions of opening for door, and we can furnish Doors all fitted ready to attach, in place of the ordinary furnace door.

REFERENCES

U. S. Capital, Washington, D. C.
Washington Brick Co., Washington, D. C.
Ebbitt House, " "
Republican Building, " "
U. S. Patent Office, " "
U. S. Navy Yard, " "
U. S. Navy Yard, Brooklyn, N. Y.
Havemeyer & Elder, " "
Havemeyer & Eastwick, Jersey City.
Philadelphia Sugar Refinery, Phila., Pa.
Dick & Meyer, Brooklyn.
Bay State Refinery, Boston.
East Boston Sugar Refinery, E. Boston.
Hartford Carpet Co., Thomsonville, Conn.
Holyoke Paper Co., Holyoke, Mass.
Quintard Iron Works, N. Y.
Meriden Britannia Co., Meriden, Conn.
Manning & Bowman, " "
National Soldiers' Home, Dayton, Ohio.
Nevins Bagging Factory, Salem, Mass.
Pemberton Mills, Lawrence, "
Canadian India Rubber Works, Mon., P.Q.
Montreal Waterworks, " "
Standard Sugar Refinery, Boston, Mass.
Barrett, Nephews & Co., Staten Island.
State Lunatic Asylum, Trenton, N. J.
Whiting Paper Co., Holyoke, Mass.
Nonatuck " " " "
Riverside Paper Co., Holyoke, Mass.
Merrick Thread Co., " "
Hadley Thread Co., " "
Pacific Mills, Lawrence, Mass.
Phosphate Mining Co.
Hay & Prentice, Chicago, Ill.
R. F. Hawkins Iron Works, Springfield, Mass.
Norwich Bleaching & Dyeing Co., Norwich, Conn.
Caldwell Iron Works, N. Y.
Jarvis Engineering Co., Boston, Mass.
Cranston Paint Works, Cranston, R. I.
B. B. & R. Knight, Readville, Mass.
Rittenhouse Woolen Mill, Passaic, N. J.
Southworth Co., West Springfield, Mass.
Niles Bros., Boston, Mass.
Mobile Ice Co., Mobile, Ala.
Hollingsworth & Vose, E. Walpole, Mass.
The Pond Machine Tool Co., Plainfield, N. J.
Harrison Bros. Co., Philadelphia, Pa.
Sailors Snug Harbor, N. Y.
Henry Warden, Philadelphia, Pa.
Granite State Mills, Guild, N. H.
The Hart Lot Paper Co., Hart Lot, N. Y.
Robert Poole & Son Co., Baltimore, Md.

Prices on application.

ASHCROFT DUPLEX OIL CUPS

For Locomotive or Stationary Engine Guides

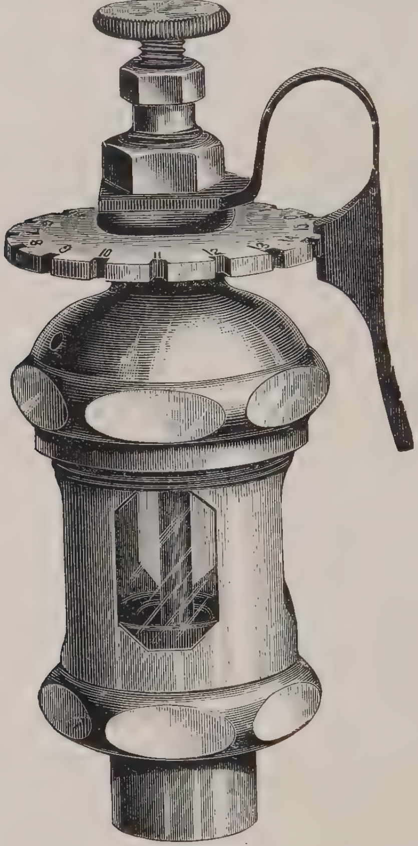


Fig. 404

DIRECTIONS FOR USING

Set the spring catch at zero in the notched disk, loosen the jam nut under the thumb wheel and screw the spindle down to its seat, then firmly secure the spindle in place by screwing the small jam nut down on to the head of the brass Cup. Fill the Cup through the large hole in the dome, the small hole is for vent, but both should remain open. So adjusted, the oil is held in the glass Cup; to cause it to feed, the spring catch is withdrawn from the zero notch, and turned in the direction that the numerals run, until the desired amount of feed is secured. By turning the spring catch back to zero, the outflow of oil is arrested and the wastage of oil stopped. By noting the number of the notch that gives the desired feed, a method is obtained for securing a uniform and economical operation of the Cup every time that it is used. The shanks are left blank and are 1¼ inches in diameter by ¾ inch long. The Cup will hold 2¼ ounces and stands 5¾ inches high from the top to the under side of base.

PRICE, $5.00 EACH

WATCHMAN'S CLOCKS

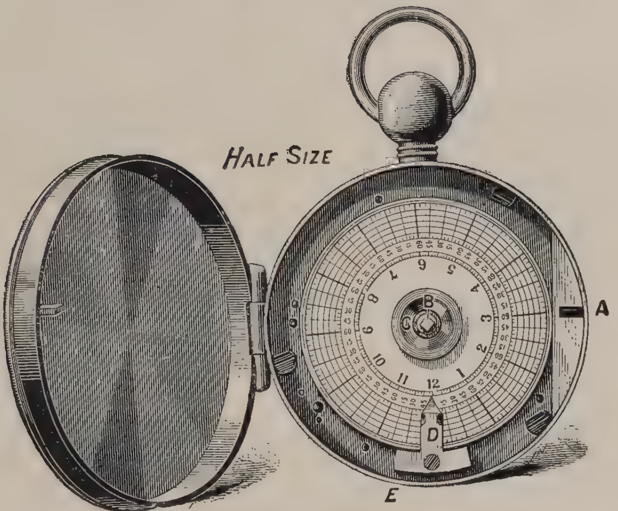


Fig. 405

The "Excelsior"

This Clock is carried by the watchman and the keys are attached by chains at such points in the territory as the watchman may be instructed to visit.

No Watchman's Clock is simpler in construction and can endure harder use than this one.

PRICES

With pouch, box of 400 paper dials, and 12 different keys, with chains for 12 stations, complete, each	$50.00

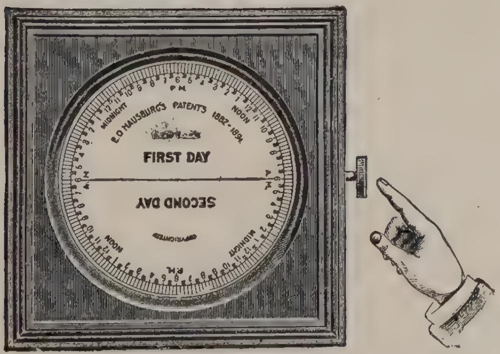


Fig. 406

The "Alert"

This is a One (1) Station Watchman's Clock.

The case is of oak, with glass front, 11 x 11, handsomely finished, dust-proof, with an excellent eight (8) day movement.

With one of these "Alert" Clocks on the top floor and another on the ground floor, and requiring the watchman to "press the button" of both each time, you can ensure his making the circuit of the entire building at such intervals of time and as often as you desire. The dial has divisions for day and night service; the record is always visible and cannot be tampered with.

PRICES

With 400 paper dials, complete, each	$10.00

STEAM SYRENS

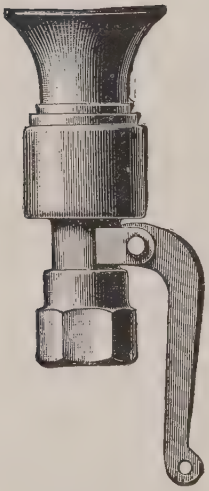


Fig. 407

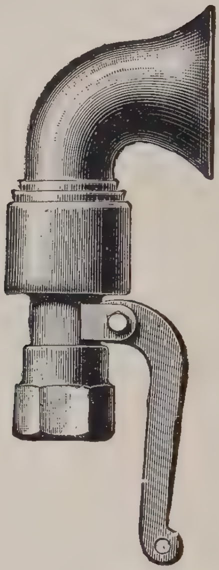


Fig. 408

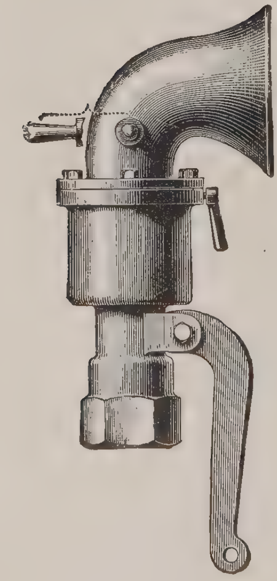


Fig. 409

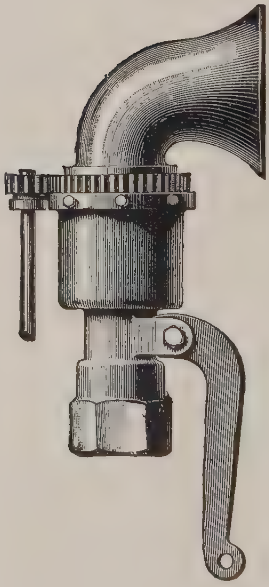


Fig. 410

For description and prices, see opposite page.

STEAM SYRENS

This Syren is specially constructed for use on board steamships, and will be found to possess advantages superior to many other steam signaling apparatus. This Syren gives the most intense, far-reaching, and distinctive sound yet obtained, and for its intense and distinctive sound it is not dependent on the shape, quality, or vibrations of the metal from which the apparatus is constructed, and it cannot be overblown, even with the highest pressures, as is the case with bell or organ pipe steam whistles. With the fixed cowl the sound is projected in a horizontal direction; the Syren may be fitted to look forward, so that the most concentrated sound will be projected in the direction of the steamer's course. With the movable cowl the Syren becomes, in acoustics, what the electrical search-light is in optics, as the sound may be projected horizontally in any required direction.

The position of other ships, land, breakers, etc., can be determined with great accuracy by moving the cowl round the horizon, and blowing quick, sharp blasts, then noting the time and direction from which the echoes are heard, when any object disturbing the level of the ocean will be detected, and its distance may be calculated. For instance, if a ship be half a mile from a cliff or a mountain, and the cowl of the Syren be turned in that direction, and the Syren sounded, the echo will be heard almost instantly, whereas, if the cowl be turned seaward, the echo has been found from practice to be ten seconds later of being heard. When in a fog, ships in the vicinity may be detected in a similar way. In one case, on the blowing of the Syren, five distinct echoes were heard almost instantly, which led the captain to believe that there were five other ships close by; on the fog lifting, this was found to be correct.

PRICES EACH

Size No.	Connection	Bellmouth Fig. 407	Fixed Cowl Fig. 408	Movable Cowl Fig. 409	Geared Cowl Fig. 410
1	¾ inch	$ 15.00	$ 20.00	$ 25.00	. .
2	1 "	22.00	27.00	32.00	. . .
3	1¼ "	30.00	35.00	40.00	. . .
4	1½ "	40.00	45.00	50.00	$ 60.00
5	2 "	65.00	75.00	85.00	100.00
6	2½ "	110.00	125.00	145.00	175.00

ASHCROFT THERMOMETERS AND LONG'S SALINOMETER POTS

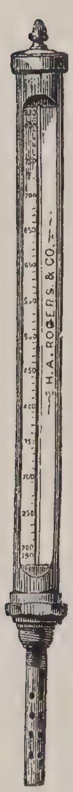


Fig. 411
Steam Pipe Thermometer

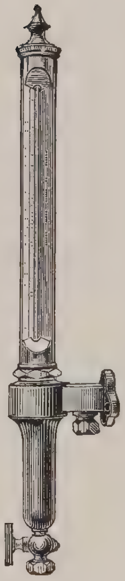


Fig. 412
Hot Well Thermometer

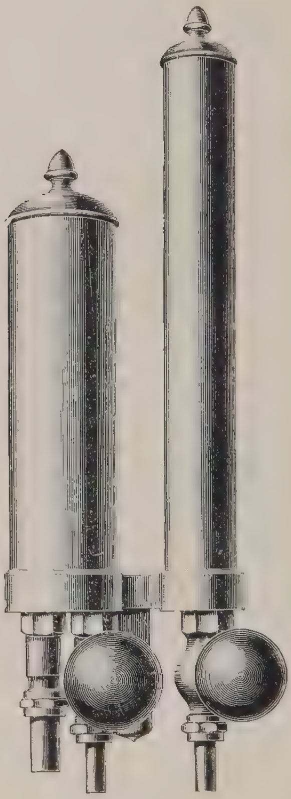


Fig. 413
Long's Salinometer Pot

PRICES

Fig. 411. Steam Pipe Thermometers, with brass sliding case, ¾-inch pipe thread connection	$15.00 each
Fig. 412. Hot Well Thermometers, with brass sliding case	35.00 "
Fig. 413. Long's Salinometer Pots, complete, with Thermometer and Glass Hydrometer	35.00 "

ASHCROFT THERMOMETERS AND MERCURIAL VACUUM GAUGES

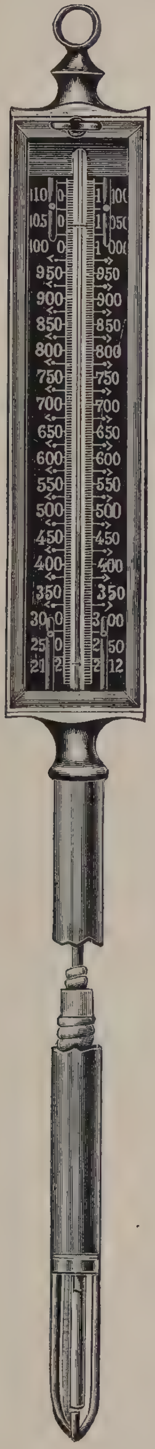


Fig. 414. Flue Gas Thermometer

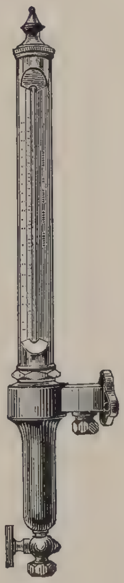


Fig. 415
Mercurial Vacuum Gauge

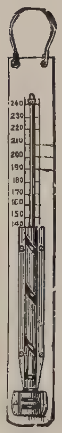


Fig. 416
Salinometer Thermometer

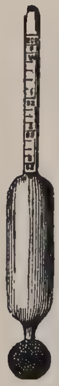


Fig. 417
Salinometer Hydrometer

PRICES

Fig. 414.	Flue Gas Thermometers for flues, uptakes, chimneys, etc., graduated to 1,000 degrees Fahr.	$50.00 each
Fig. 415.	Mercurial Vacuum Gauges, with brass sliding covers	35.00 "
Fig. 416.	Salinometer Thermometers	1.50 "
Fig. 417.	Salinometer Hydrometers, Glass	1.50 "
	" " Copper	10.00 "

MOSCROP CONTINUOUS SPEED RECORDERS

For Steam, Electric, and Cable Engines and Water Motors

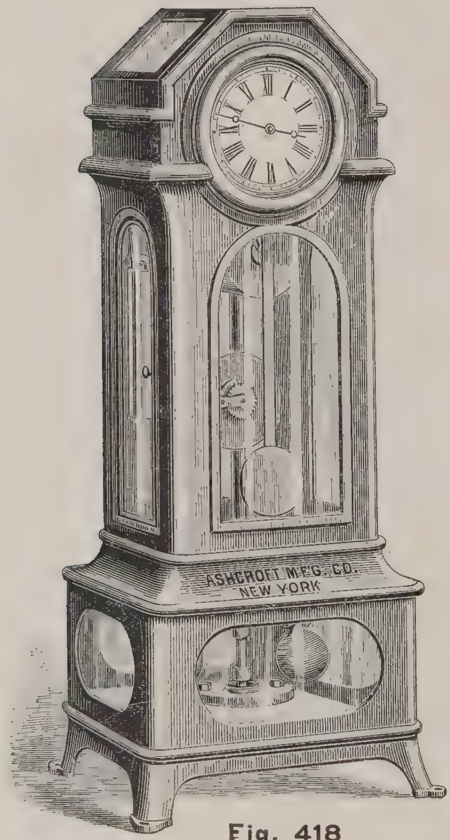


Fig. 418

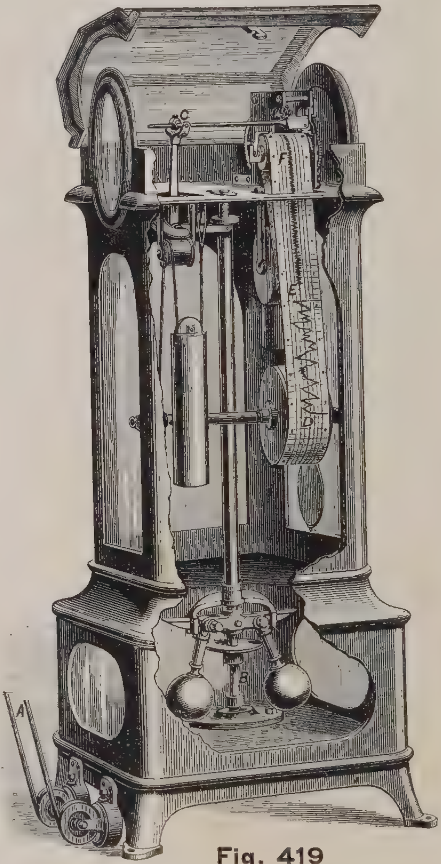


Fig. 419

If an engine makes its correct number of revolutions each minute, it is usually considered to be running satisfactorily ; but why should 60 seconds be taken as a test ? Assume that an engine has been arranged to make 60 revolutions per minute, and does it continuously, yet it by no means follows that it makes one revolution per second, still less that its speed during that revolution is uniform. The fact is, its momentary speed oscillates above and below its average speed, and the amount of this oscillation determines the degree of steadiness as distinguished from speed.

MOSCROP CONTINUOUS SPEED RECORDERS

There are two kinds of unsteadiness in the turning of an engine. First, the unsteadiness caused by the intermittent impetus given to the piston by the steam (this is corrected more or less by the fly-wheel) Secondly, the unsteadiness caused by the constantly varying proportions between the power and the load (this is corrected more or less by the governing gear of the engine). The first kind of unsteadiness, which we call the fly-wheel unsteadiness, shows itself on the Recorder's diagram by the line being more or less wide.

The second kind of unsteadiness, which we call governing unsteadiness, shows itself by the line being more or less crooked. With regard to fly-wheel unsteadiness, it is frequently intensified by the valves being imperfectly adjusted; or, in the case of an engine having two cranks, by the respective cylinders not exercising equal power, but more especially by a late cut-off and a low rate of revolution.

The origin of the second kind of unsteadiness, or governing unsteadiness, is legion; and it would be beyond the province of a trade catalogue to deal with the subject adequately. It may be said, that the most frequent cause lies in the governing gear not being sufficiently sensitive. The increased power of a governor under an increased speed of 1 per cent., is very feeble. The experience of having the Recorder attached to many engines shows that an engine has frequently to increase its speed 6 per cent. before the centrifugal force of the governor can overcome the friction of the gear, while in a very few cases ½ per cent. is sufficient. Another cause of governing unsteadiness is too much play in the gear, which has to be taken up before the valve responds. Another cause, the governing may be correctly adjusted, but may, when there is an alteration in speed, cut off too much or too little. Another cause, the governing gear may be defective in principle, may involve too much friction, or may trip the governor, making it impossible to measure out the steam with that nicety which is requisite for good work. Another cause lies in the principle of a throttle valve as distinguished from a cut-off; in the former the governor has no control over steam in transit between throttle valve and cylinder ports; the consequence is, in a case where the load constantly varies, that the governing is too sluggish, as a second alteration occurs before the valve has been accommodated to the first, and the result is a perpetual state of unrest.

It is often said, "Our engine is running perfectly, and if it were not, we could detect it." In reply, we confidently assert that an oscillation in unsteadiness of 1 per cent. cannot be detected directly by the senses. Most engines have a governing unsteadiness of 3 per cent. Really good work should not allow a variation in excess of ½ per cent.

MOSCROP CONTINUOUS SPEED RECORDERS

GENERAL DESCRIPTION

The Recorder consists of an iron case with glass sides, containing an eight day pendulum clock, which moves a continuous paper band upon which is made the autographic record, by an inked marker actuated by the motion of the governor balls which rise and fall under varying speeds. Figure No. 419 gives a side view, with part of the frame removed, showing the clock movement and the interior construction of the Recorder. The belt A, from the shaft whose revolutions it is desired to record, is brought under the idler pulleys in the rear of the base of the instrument to a horizontal pulley that should be speeded at 84 to 96 revolutions per minute; the best possible speed being 90.

The pulley is secured to an upright shaft B, rising through the center of the instrument; to this shaft is attached a pair of governor balls which rise by centrifugal force when the central shaft is revolved. The upward motion of these balls is transmitted through a sleeve covering the central shaft to a bell crank in the rear of the clock movement; attached to this bell crank is an arm carrying a marker; when the engine has attained the standard speed, the marker comes up to the central longitudinal line D on the paper. From D to E on the paper is shown record of uneven speed, while from E to F is a record such as would be made by a uniform speed. Should the speed of the engine be increased 3 per cent., the marker would pass over the paper to the next parallel line to the left; each variation, as recorded by the marker, passing from one parallel line to another, denotes an increase or decrease of speed from the standard of 3 per cent.

When the engine is stopped the marker is pushed entirely off the paper, and it cannot return to make any record until the engine has been started again. As each space on the paper between the perforations indicates an hour in time, the length of the interval between the starting and stopping of the engine is thus recorded, also the exact moment of all variations of speed. The paper band furnished with each instrument is sufficiently long to last for a three months' run. Floor space occupied by Recorder, 1 ft., 9 in. square; height, 4 ft., 6 in.

PRICE, $200.00 EACH

When ordering a Recorder, state the exact diameter of shaft and the revolutions per minute, and a pulley will be sent with the machine to drive it at the required speed, provided pulley is not too large to hang in the 1 foot 6 inches square of base.

MOSCROP CONTINUOUS SPEED RECORDERS

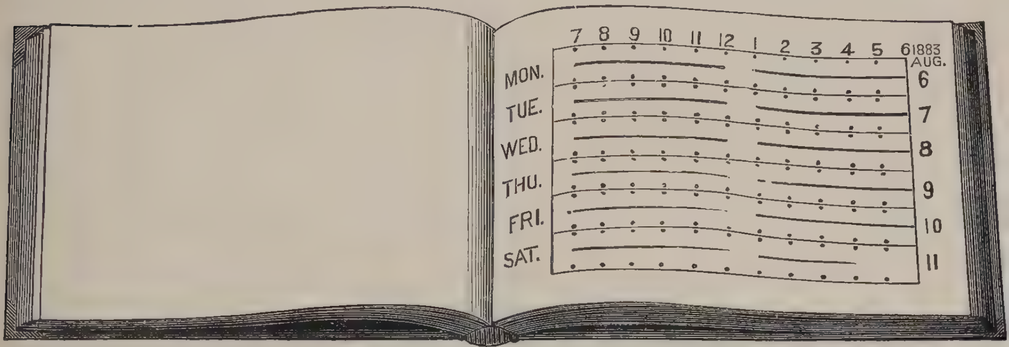


Fig. 420

PRICE, $2.50 EACH

This cut represents the book in which the records are kept, the book being arranged so that each line represents a day, and each page a week, to which the date is attached when the record strips are pasted in. By this means a permanent autographic record is preserved of the engine's performance, and by turning to any date required, however far back, all the particulars for that day are duly found: Time of starting, time run, speed, variations of speed, time of stopping, all infallibly registered by the engine itself.

Chicago Edison Company

Chicago, October 31, 1896.

The Ashcroft Manufacturing Company
New York

Gentlemen: Replying to your recent communication as to the merits of the Moscrop Speed Recorder which you furnished us for use in our Central Stations, we beg to state that the instrument has been of great assistance to us in testing the uniformity of speed in our engines. It is reliable in its operation, and we consider it a valuable adjunct to our Central Station equipment.

Yours truly,
(Signed) Samuel Insull, President.

MOSCROP CONTINUOUS SPEED RECORDERS

The Following are Copies of Actual Records Taken
strate the Workings of the

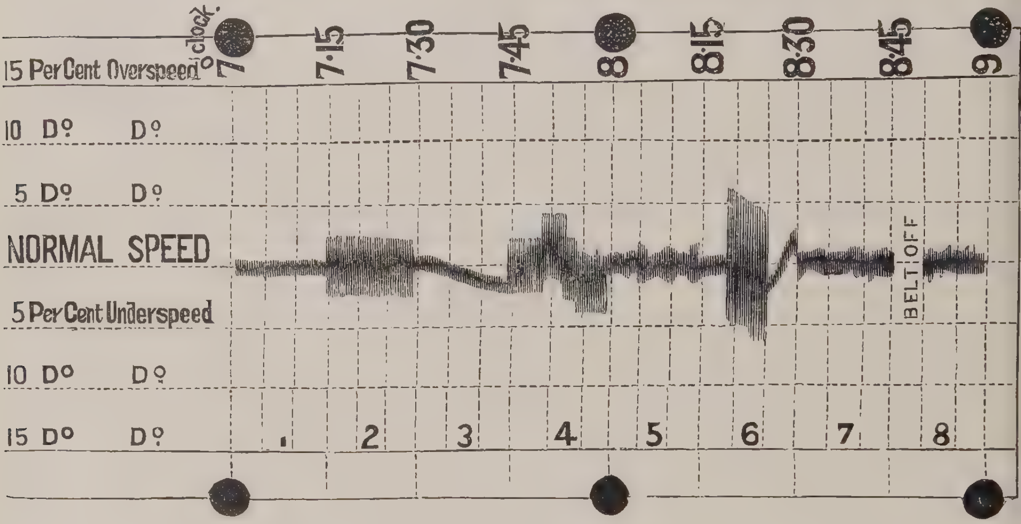


Fig. 421

No. 1. This is almost perfection. The example begins at one minute past seven and continues till 7:15; the narrow line shows plenty of fly-wheel momentum, and the straight line, good governing. The fly-wheel unsteadiness is under 1 per cent., and the governing unsteadiness practically nil. It drives mules and preparation.

No. 2. 7:15 to 7:30 illustrates small fly-wheel momentum combined with good governing. The fly-wheel unsteadiness is about 5 per cent.

No. 3. 7:30 to 7:45 illustrates great fly-wheel momentum, governing rather imperfect. Here the speed has decreased one per cent. by 7:45 (that is a third of a space). As the decrease was gradual, the probability is that it was caused by the steam being down and the governing not equal to the occasion.

No. 4. 7:45 to 8 illustrates small fly-wheel momentum and imperfect governing. Here the speed suddenly increased 2½ per cent. at 7:50. This would appear to be, by its suddenness, a change in the load, and the governing not equal to the occasion.

No. 5. 8 to 8:15 is a familiar diagram; it looks much like mule spinning and throttle valve.

No. 6. 8:15 to 8:30 is frequently met with. Without doubt the governing gear began to stick at 8:18, the speed oscillating 12 per cent. till 8:25. It should be corrected without delay; the oscillations have their ebb and flow in periods of a few seconds, and are the unsuspected cause of bad work. This is a good instance of an engine running its normal speed, yet being all the while dangerously unsteady, subjecting the weak parts of the engine and gearing to a severe test. Unsteady driving is the proximate cause of most breakdowns, and the original cause of many.

MOSCROP CONTINUOUS SPEED RECORDERS

from Different Engines, and Assembled to Demon- Moscrop Continuous Recorder

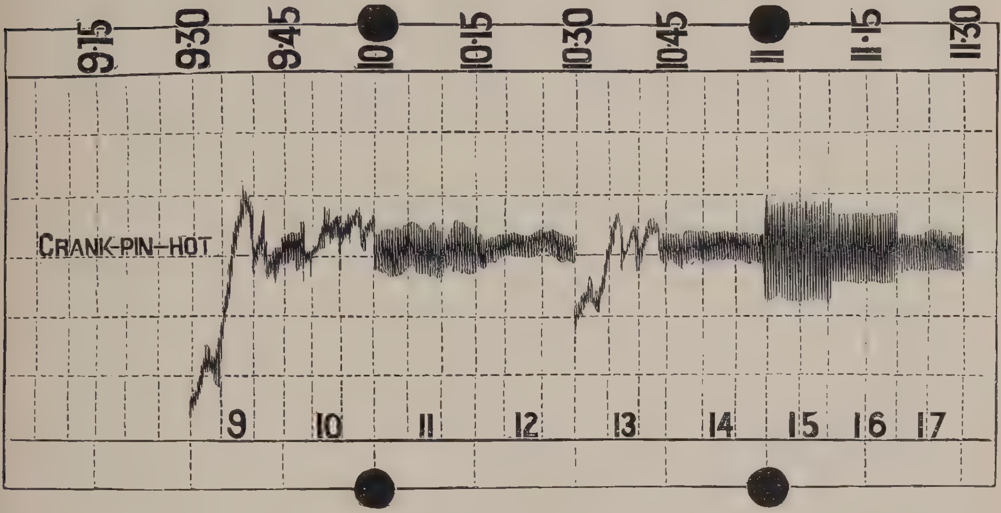


Fig. 422

Nos. 7 and 8. 8:30 to 9 illustrates respectable mediocrity. It is introduced to show that at 8:46 the engine stopped, through belt being off.

As one of the objects in these illustrations is to make the reading of the records intelligible, we will now assume that the engine stopped from 9 o'clock to 9:30 for repairs.

Nos. 9, 10, 11, 12. Are diagrams from the same engine. 9 is the diagram when the recorder was first applied; 10, 11, 12 are stages in the improvement in engine's workings as the faults are remedied.

Nos. 13, 14. Are another instance of improved running. This engine has been speeded 2½ per cent., and yet never attains the speed it formerly attained during its oscillation It is now always at its highest speed, combining steady turning with maximum turnout. If an engine is making 60 revolutions, and it proves to be oscillating in steadiness from 59 to 61, it is obvious that it is either running too quickly for good work at 61, or it is losing output when at 59.

Nos. 15, 16, 17. Are from the same engine, and are placed here to show vividly the advantage in steadiness of turning of having an engine lightly loaded. 15 is the record of full load, that is 450 H. P. 16 with a partial load, that is 250 H. P. 17 with a small load, that is 150 H. P. This engine was fitted with a supplementary governor, and it is worthy of note that it preserved its speed (automatic cut-off) under a change of load from 450 H. P. to 150 H. P. It was also subjected to a similar test with a varied steam pressure giving equally good results.

McCRACKEN STEAM TRAPS

This trap is positive in action, durable, and simple in construction, the parts are easily replaced and adjusted and they are all interchangeable; it occupies but little space and can be set in any position. It has no diaphragm, float, cock, or spring, but depends for its action upon the alternate expansion and contraction of a piece of straight brass tubing secured at one end, closing and opening on a soft metal seat at the other end, thus allowing the water of condensation to escape, and close the outlet when the steam enters the brass tube.

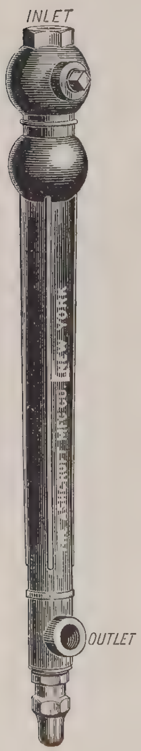


Fig. 423

DIRECTIONS FOR SETTING AND WORKING

To the steam pipe to be drained attach the trap by the tapped hole in the upper ball. The outlet may discharge into the air, into a closed vessel, or under water, as desired.

To adjust the trap, remove the brass cap and open the adjusting screw, which has a hole in the head, until the steam blows freely from the outlet, thus giving the brass tube running through the inside of the trap an opportunity to expand; then turn the adjusting screw down until the outflow of steam is stopped, and secure the screw in this position with the jamb nut. As the water of condensation accumulates in the brass tube, the water being cooler than the steam will cause the brass tube to contract and open the outlet, allowing the water to escape, and as the steam follows it will again close and be securely trapped. The adjustment admits of variation in the temperature of the water delivered from 140° to 210°.

To test the trap when the outlet discharge is not visible, put a drop of water on discharge pipe close to the trap, and if it boils, the adjusting screw needs to be set down, as the trap is letting steam escape. If, after long use, the adjusting screw fails to close the trap, cut off the steam and unscrew the chamber holding the soft metal seat in front of the adjusting screw. The seat will then drop out and can be reversed, and after both sides are cut it may be refaced with a file. Under ordinary conditions one adjustment should answer for a long time.

The opening in the side of the first ball is intended to give access to the interior for the removal of any foreign substance that may pass the strainer. If desired, a blow-off valve may be used in place of the plug sent with each trap to stop the opening.

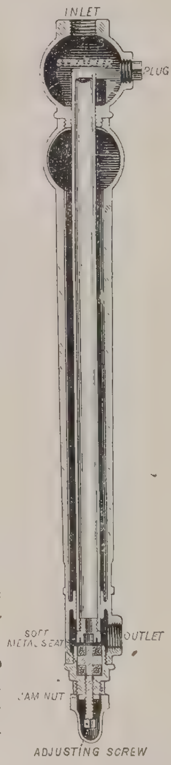


Fig. 424

PRICES

Number.	Number feet of 1-in. Pipe it will drain.	Size of Inlet Pipe	Size of Outlet Pipe.	Length over all.	Diameter of largest part.	Price, each.
1	2,000	¾ inch.	½ inch.	27 inches.	3¼ inches.	$16.00
2	4,000	1 "	¾ "	33¼ "	3⅞ "	20.00
3	8,000	1¼ "	1 "	40¾ "	4½ "	30.00

ROYLE STEAM TRAPS

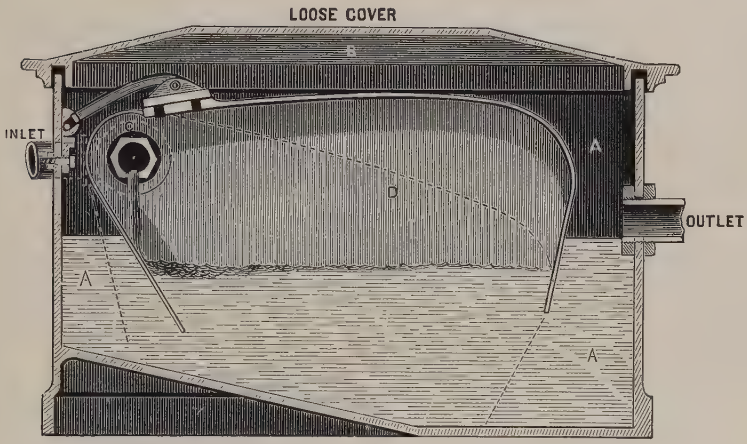


Fig. 425

PRICES

Number of trap	1	2	3
Size of pipe connection, Inlet	½ inch	1 inch	1½ inch
" " " Outlet	¾ inch	1¼ inch	2 inch
Number of feet of 1-inch pipe each trap will drain	3,000	5,000	8,000
Prices . . . each	$18.00	$25.00	$36.00

CONSTRUCTION

A is a cast-iron reservoir with outlet at side. B is a loose cover. C is a plug cock on one side, steam jacketed to secure equal expansion and easy working of same. This cock is connected with inlet and leads into and is operated by D, an *open bottomed copper float.* E is an air or slide valve, held in place with an arm connected to side wall of traps and adjusted by a regulating set screw.

DIRECTIONS

Blow out all dirt from the new pipes, connect inlet with pipes or apparatus to be trapped, setting trap level, so that water will gravitate into it freely. The *outlets* must be *free*, and with *no back pressure.* For use: fill reservoir with water to level of outlet, raise air valve and let the confined air in float escape, till edge of float rests on the bottom.

ITS OPERATION

When float D rests on the bottom the cock C is open, and condensed water will flow freely and escape at outlet until steam comes to fill and raise the float which closes the cock C and also the air valve on top of the float confining steam within the float; as this steam slowly condenses, D falls and C opens, and so on, constantly discharging all water of condensation and keeping live steam behind the trap. Movement of the adjusting screw connected to E makes action of trap more or less rapid.

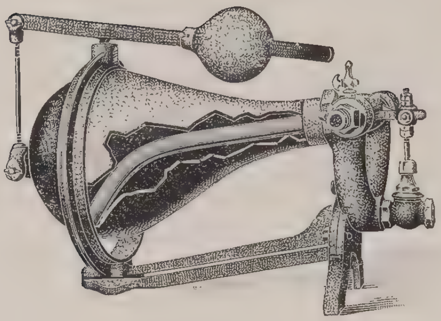
TO KNOW WHEN WORKING

Lift cover B and raise air valve E from its seat. If steam then escapes there is no water behind trap. Should float D be raised, lift air valve E till float D settles to the bottom.

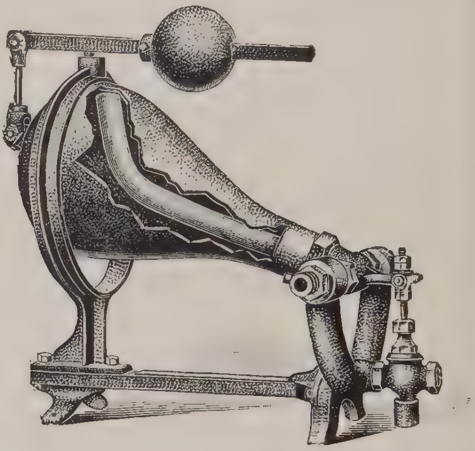
NOTICE

The cock C, the only wearing part, is adjustable, and can be turned to present a fresh wearing surface. It is easily removed for regrinding, and, should it ever wear out, can be replaced.

BUNDY RETURN AND TANK STEAM TRAPS



Return Trap
Fig. 426



Tank Trap
Fig. 427

PRICES

Bundy Return Steam Trap

FIG. 426

To work under any steam pressure up to 100 lbs.

No.	Dimensions.			Shipping Weight, Pounds.	Pipe Connections.		Capacity in water delivered to boiler per hour.		Drainage Capacity in feet of 1-inch pipe.	Capacity in H. P.	Prices, each.
	Width, inches.	Length, inches.	Height, inches.		Water Inlet and Outlet. Inches.	Steam Inlet. Inches.	Pounds.	Gallons.			
101	24	31	33	160	1	1	1,250	150	6,000	Up to 40	$100
102	25	34	35	220	1¼	1¼	2,000	240	10,000	40– 65	150
103	26	37	41	280	1½	1½	4,000	480	20,000	65–125	200
104	29	44	42	461	2	1½	6,000	720	40,000	125–200	300

Bundy Separating or Tank Steam Trap

FIG. 427

To work under any steam pressure up to 80 lbs.

No.	Dimensions.			Shipping weight Pounds.	Pipe Connections.		Capacity in water discharged per hour.		Drainage Capacity in lineal feet of 1-inch pipe.	Prices, each.
	Width, inches.	Length, inches.	Height, inches.		Inlet. Inches.	Outlet. Inches.	Pounds.	Gallons.		
50	9	21	15	40	¼	¼	300	36	1,800	$15
51	13	24	21	94	⅜	⅜	500	60	3,500	25
52	14	25	22	118	½	½	1,000	120	7,500	35
53	17	31	26	155	¾	¾	2,000	240	15,000	55
54	17	33	27	200	1	1	3,333	400	25,000	85
55	. .	. .	. .	. .	1¼	1¼	4,166	500	32,000	120

PIPE FITTERS AND MACHINISTS' TOOLS

ASHCROFT PIPE STOCKS AND DIES

for Wrought Iron or Steel Pipe

No. 0. 1. 1½. 1¾. 2 and 3

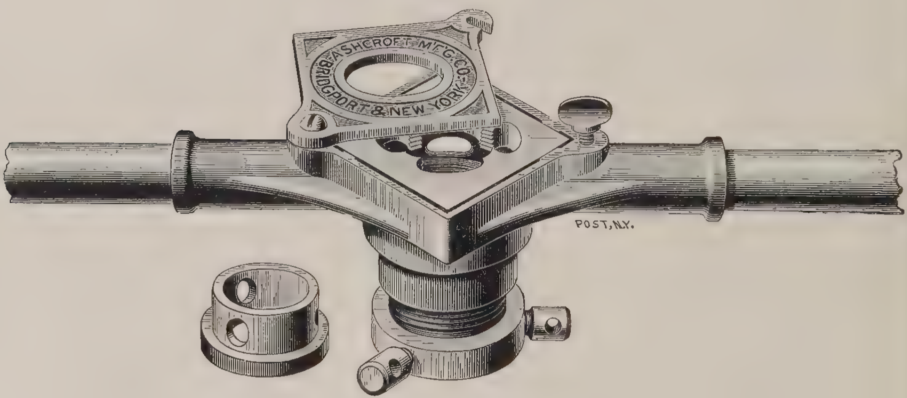

ASHCROFT M'F'G. CO.
BRIDGPORT & NEW YORK
POST, N.Y.

Fig. 428

No. 3½

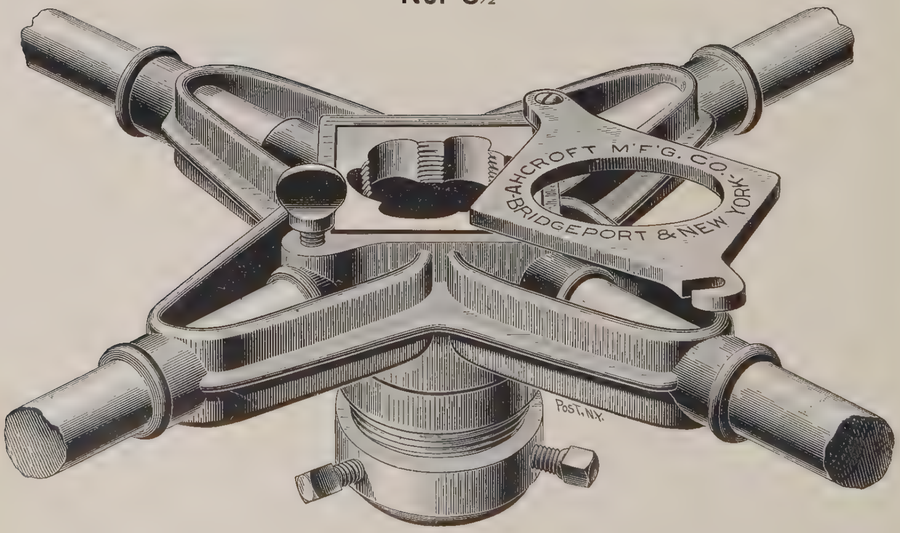

AHCROFT M'F'G. CO.
BRIDGEPORT & NEW YORK
POST, N.Y.

Fig. 429

For prices, see page opposite.

ASHCROFT PIPE STOCKS AND DIES

For Wrought Iron or Steel Pipe

PRICES

No.	0	1	1½	1¾	2	3	3½
Threads . .	⅛, ¼, ⅜, ½	¼, ⅜, ½, ¾, 1	¾, 1, 1¼	1, 1¼, 1½	1¼, 1½, 2	2½, 3	2½, 3
Size of Dies . .	2 x ½	2½ x ¾	3 x ¾	3 x ¾	4 x ⅞	5 x 1¼	5 x 1¼
Complete . . .	$9.50	$15.00	$13.50	$13.50	$20.00	$43.00	$51.00
Stock only . .	3.50	5.00	6.00	6.00	9.50	25.00	33.00
Extra Dies . .	1.50	2.00	2.50	2.50	3.50	9.00	9.00
" Bushings	.25	.35	.45	.45	.60	1.00	1.00
Die Frames. .	. . . .	.30	.40	.40	.50	.60	.60

Stocks Nos. 2, 3, and 3½ have leader screw.

When ordered in quantities, brass cap plates, with customer's name cast in them, will be furnished, without extra charge, if so stated in order.

Prices on above, with Dies for English gas pipe thread, on application.

ASHCROFT PIPE STOCKS AND DIES

For Wrought Iron or Steel Pipe

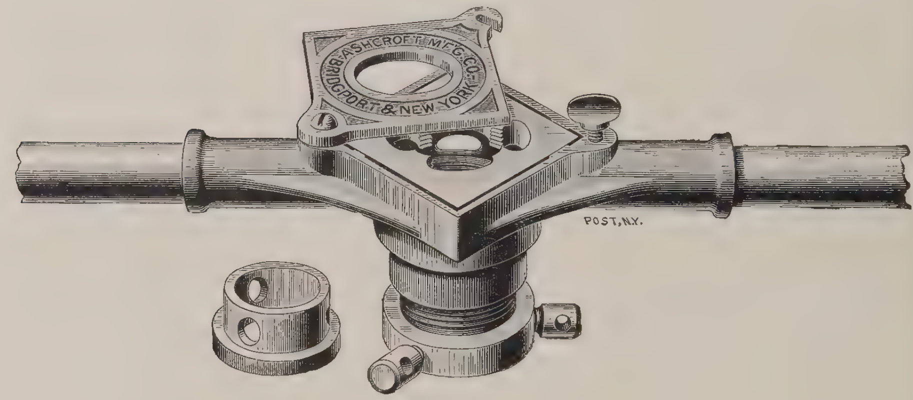


Fig. 430

Of Walworth Sizes

PRICES

No.	0	1	$1\frac{1}{2}$	$1\frac{3}{4}$	2	3	$3\frac{1}{2}$
Threads . . .	$\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{2}$	$\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1	$\frac{3}{4}$, 1, $1\frac{1}{4}$	1, $1\frac{1}{4}$, $1\frac{1}{2}$	$1\frac{1}{4}$, $1\frac{1}{2}$, 2	$2\frac{1}{2}$, 3	$2\frac{1}{2}$, 3
Size of Dies. .	2 x $\frac{1}{2}$	$2\frac{3}{8}$ x $\frac{3}{4}$	3 x $\frac{3}{4}$	3 x $\frac{}{4}$	$3\frac{7}{8}$ x $\frac{7}{8}$	$4\frac{7}{8}$ x $1\frac{1}{4}$	$4\frac{7}{8}$ x $1\frac{1}{4}$
Complete . . .	$9.50	$15.00	$13.50	$13.50	$20.00	$43.00	$51.00
Stock only . .	3.50	5.00	6.00	6.00	9.50	25.00	33.00
Extra Dies . .	1.50	2.00	2.50	2.50	3.50	9.00	9.00
" Bushings	.25	.35	.45	.45	.60	1.00	1.00
Die Frames . .	. . . .	.30	.40	.40	.50	.60	.60

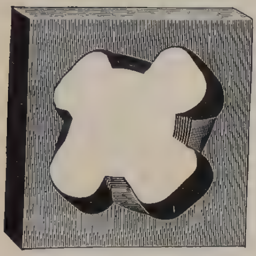
Stocks Nos. 2, 3, and 3½ have leader screw.

When ordered in quantities, brass cap plates, with customer's name cast in them, will be furnished, without extra charge, if so stated in order.

Prices on above, with Dies for English gas pipe thread, on application.

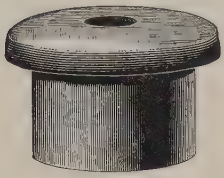
ASHCROFT PIPE DIES, BUSHINGS AND DIE FRAMES

For Wrought Iron and Steel Pipe



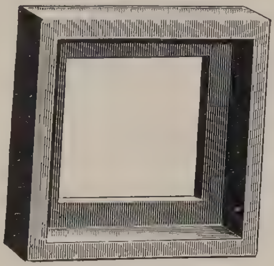
PIPE DIE

Fig. 431



BUSHING

Fig. 432



DIE FRAME

Fig. 433

We make these goods to interchange with all standard makes of Pipe Stocks and Dies for hand use.

PRICES

Pipe Dies, Right or Left Hand

No.	0	1	1½	1¾	2	3	3½
Measures. . .	2 x ½	2½ x ¾ or 2⅝ x ¾	3 x ¾	3 x ¾	4 x ⅞ 4 x 1 or 3⅞ x ⅞	5 x 1¼ or 4⅞ x 1¼	5 x 1¼ or 4⅞ x 1¼
Sizes.	⅛, ¼, ⅜, ½	⅛, ¼ ⅜, ½, ¾, 1	⅛, ¼, ⅜ ½, ¾, 1, 1¼	⅛, ¼, ⅜ ½, ¾, 1, 1¼, 1½	½, ¾, 1 1¼, 1½ 2	2½, 3	2½, 3
Each.	$1.50	$2.00	$2.50	$2.50	$3.50	$9.00	$9.00

Bushings

No.	0	1	1½	1¾	2	3	3½
Sizes.	⅛, ¼, ⅜	⅛, ¼, ⅜ ½, ¾, 1	⅛, ¼, ⅜ ½, ¾, 1	⅛, ¼, ⅜ ½, ¾, 1 1¼	½, ¾, 1 1¼, 1½	2 2½	2 2½
Each.	$0.25	$0.35	$0.45	$0.45	$0.60	$1.00	$1.00

Die Frames

No.		1	1½	1¾	2	3	3½
Taking. . . .	. . . . . .	No. 0	No. 1	No. 1	No. 1 or 1½	No. 2	No. 2
Each.	. . . . . .	.30	.40	.40	.50	.60	.60

ASHCROFT PIPE TAPS

Right or Left Hand

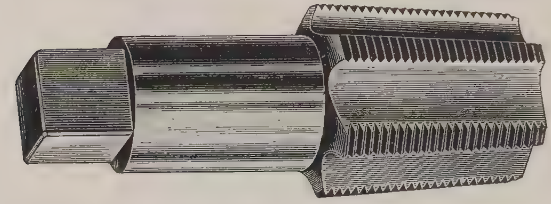


Fig. 434

PRICES

Diameter	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4 in.
Price, each	$1.12	1.25	1.50	1.87	2.50	3.12	3.75	4.62	6.25	10.50	15.00	42.00	50.00
Threads, per in. . .	27	18	18	14	14	11½	11½	11½	11½	8	8	. .	. .

ASHCROFT PIPE REAMERS

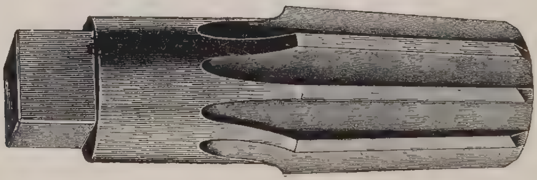


Fig. 435

PRICES

Diameter	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4 in.
Price each	$1.12	1.25	1.50	1.87	2.50	3.12	3.75	4.62	6.25	10.50	15.00	42.00	50.00

VULCAN CHAIN TONGS

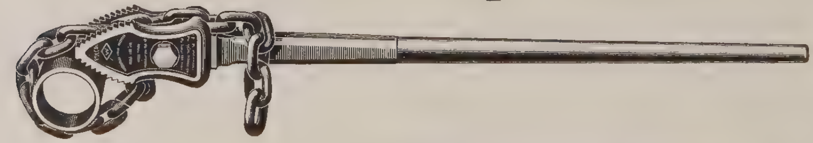


Fig. 436

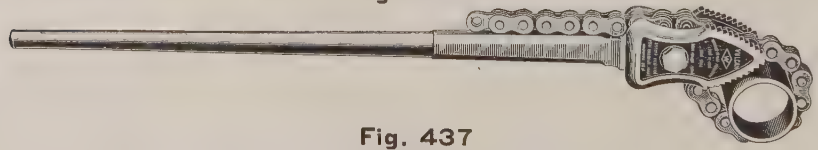


Fig. 437

PRICES

Size	No. 10	No. 11	No. 12	No. 13	No. 13½	No. 14	No. 15	No. 16
Price, with flat-link chain, each	$2.50	$3.50	$5.00	$7.00	$9.00	$11.00	$18.00	$40.00
Price, with cable chain, each..	2.25	3.25	4.50	6.25	7.75	9.50	16.00	40.00
Capacity, size pipe	⅛ to ¾ in.	⅛ to 1½ in.	¼ to 2½ in.	¾ to 4 in.	1 to 6 in.	1½ to 8 in.	2 to 12 in.	4 to 18 in.
Length over all	13¼ in.	20 in.	27 in.	37 in.	44½ in.	50½ in.	64½ in.	87 in.
Extra flat-link chains, each	$0.75	$1.00	$1.50	$2.50	$3.25	$4.00	$6.00	$13.00
Extra cable chains, each	0.50	.75	1.00	1.75	2.00	2.50	4.00	13.00
Extra jaws, pair	1.00	1.75	2.75	4.00	4.75	5.50	7.50	16.00

ROBBINS' CHAIN TONGS

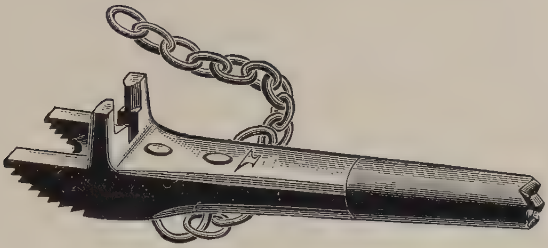


Fig. 438

PRICES

No.	Length.	Capacity.	Prices.
2	27 inches	1 to 3 in.	$5.50
3	3 feet	1¼ " 5 "	6.25
4	4 "	2 " 7 "	9.00
5	5 "	2½ " 10 "	12.50
6	6 "	4 " 16 "	16.00

STANDARD CHAIN TONGS

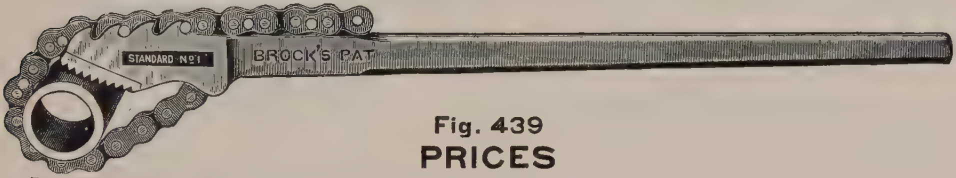


Fig. 439

PRICES

Size	No. 1	No. 2	No. 3	No. 3½	No. 4	No. 5
Prices, each . . .	$3.50	$5.50	$7.50	$9.00	$11.00	$18.00
Capacity	¼ to 1½ in.	¼ to 2½ in.	¾ to 4 in.	1 to 6 in.	1½ to 8 in.	2 to 14 in.
Length	20 in.	27 in.	37 in.	44 in.	50 in.	64 in.
Extra chains, each	$1.00	$2.00	$3.00	$3.50	$4.00	$6.00
Extra shoes, each	.87	1.37	2.00	2.25	2.50	3.00

TRIMO GIANT CHAIN TONGS

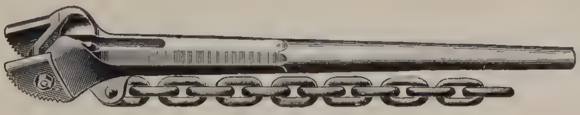


Fig. 440

PRICES

Number	2	3	4	5	6	7
Length of Lever	27 in.	37 in.	50 in.	60 in.	72 in.	84 in.
Takes Pipe	¾ to 3	1 to 4	2 to 6	2½ to 10	3 to 12	4 to 16
Each	$6.00	$8.00	$10.00	$15.00	$18.00	$32.00
Extra Jaws, per pair . . .	1.75	2.25	2.75	3.50	4.00	5.00

BROWN'S ADJUSTABLE PIPE TONGS

TRADE MARK
EHA

None genuine unless stamped with our trademark.

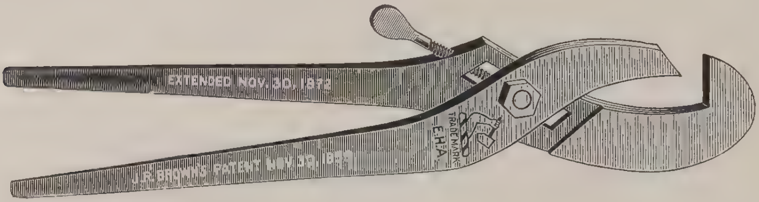


Fig. 441

PRICES EACH

No.	Size	Price	No.	Size	Price
No. 1.	For ⅛ to ¾ inch pipe	$ .60	No. 4.	For 1½ to 3 inch pipe	$2.70
" 1½.	" ⅜ " 1 " "	.75	" 5.	" 2½ " 4 " "	6.00
" 2.	" ½ " 1¼ " "	.85	" 6.	" 3 " 5 " "	10.00
" 3.	" 1 " 2 " "	1.20	" 7.	" 4 " 7 " "	11.00

We are the original producers and the largest manufacturers of these tools, which for more than thirty years have stood at the head of the list of steam and gasfitters' tools.

The forgings are made of steel of liberal weight and properly proportioned to each other for the necessary strength and durability required of them.

The longer or hooked jaw is not a dropped forging, with a trimmed seam down its central length, the presence of which is liable to injure the pipe, but is a forging turned by skilled hand labor over a metal former, so as to ensure a perfectly flat and full bearing on the pipe the entire width of its inside surface.

The short or dog jaw is carefully faced with best tool steel, and is made equal width of the hook jaw and ground true, so as to grip the pipe its full width without any liability of crushing it. This jaw is made sufficiently long to allow of its being reground or sharpened many times without reducing the original pipe-holding capacity of the tongs—a valuable feature that will be appreciated by the users.

The holding or pipe capacity of every pair of our tongs is carefully tested before shipments are made, and will always be found to equal our catalogue claims.

COMMON PIPE TONGS

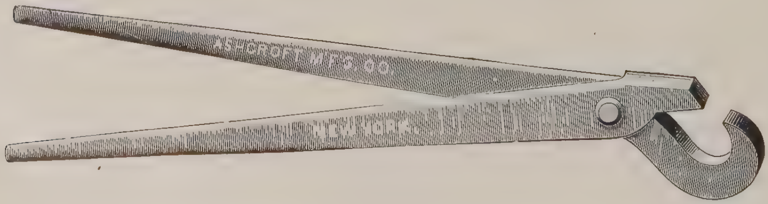


Fig. 442

PRICES

Sizes, inches,	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Prices, each,	.60	.65	.70	.75	.90	$1.10	1.30	1.50	1.90	2.50	4.00

GAS PLIERS

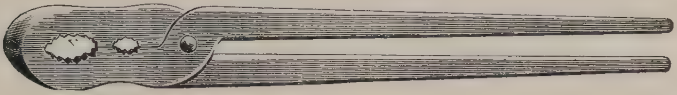


Fig. 443

PRICES

5 in.	long,	solid	steel,	per	doz.,	$6.00		9 in.	long,	solid	steel,	per	doz.,	$10.25
6 “	“	“	“	“	“	7.00		10 “	“	“	“	“	“	12.50
7 “	“	“	“	“	“	8.00		12 “	“	“	“	“	“	14.50
8 “	“	“	“	“	“	9.25		14 “	“	“	“	“	“	16.50

DUDGEON TYPE ROLLER TUBE EXPANDER

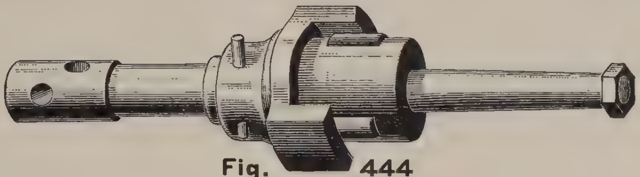


Fig. 444

PRICES

Diameter, inches,	1	1¼	1½	1¾	1⅞	2	2¼	2½	2¾
Price, each	$10.00	10 00	10.00	10.00	10.00	10.00	12.00	14.00	16.00
Diameter, inches,	3	3¼	3½	3¾	4	4¼	4½	5	6
Price, each,	$18.00	20.00	23.00	25.00	30.00	35.00	40.00	50.00	60.00

PARKER'S COMBINATION PIPE VISES

PRICES

No. 87. For holding 2 in. pipe and under. Length of jaws, 3⅝ in.
W'ght, 41 lbs. Ea., $16.00

No. 88. For holding 3 in. pipe and under. Length of jaws, 4⅛ in.
W'ght, 59 lbs. Ea., $20.00

No. 288½. For holding 4 in. pipe and under. Length of jaws, 4¾ in.
W'ght, 105 lbs. Ea., $28.00

No. 289½. For holding 6 in. pipe and under. Length of jaws, 5⅜ in.
W'ght 155 lbs Ea. $35.00

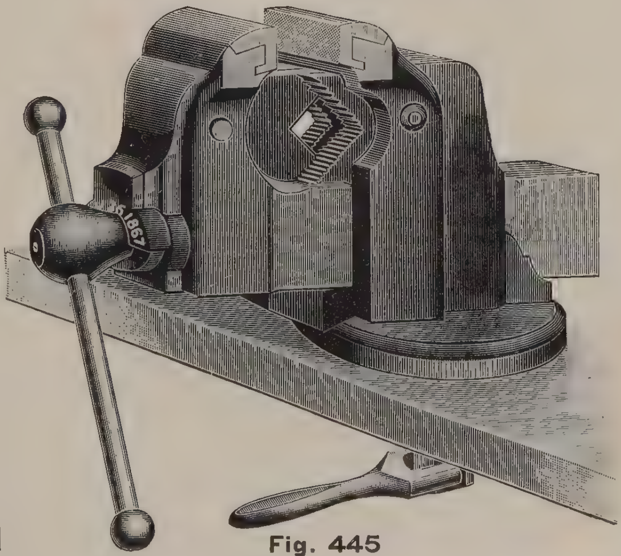


Fig. 445

PHOENIX PIPE VISES

No. 0

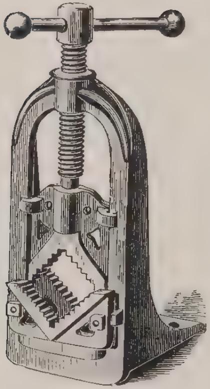


Fig. 446

No. 1

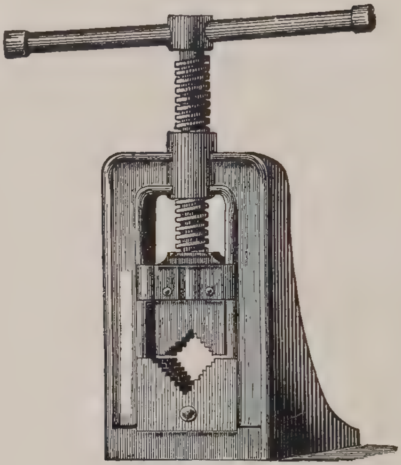


Fig. 447

Nos. 5 & 10

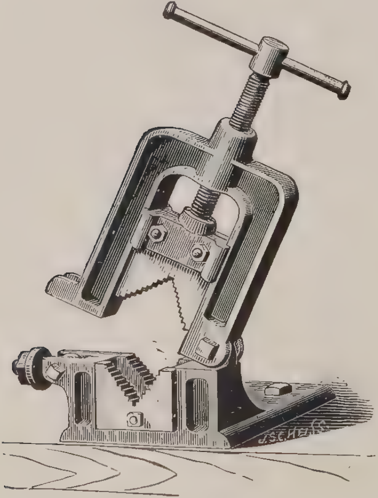


Fig. 448

Nos. 15–20–25

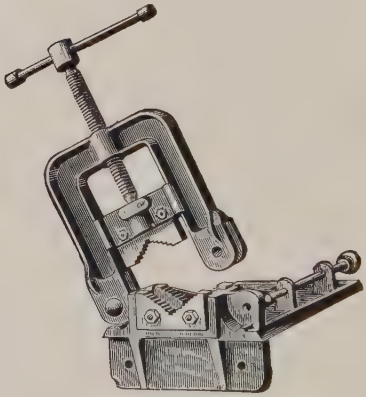


Fig. 449

PRICES

Fig. No. 446.	No. 0	Vise, takes pipe	⅛ in. to 2	in.	. . . .	each,	$3.50
" " 447.	" 1	" " "	⅛ in. to 2½	in.	. . . .	"	4.25
" " 448.	" 5	" " "	⅛ in. to 2½	in.	. . . .	"	5.00
" " 448.	" 10	" " "	¼ in. to 4	in.	. . . .	"	9.00
" " 449.	" 15	" " "	⅛ in. to 3	in.	. . . .	"	6.50
" " 449.	" 20	" " "	⅛ in. to 4	in.	. . . .	"	9.00
" " 449.	" 25	" " "	½ in. to 6	in.	. . . .	"	15.00

SAUNDER'S PIPE VISES

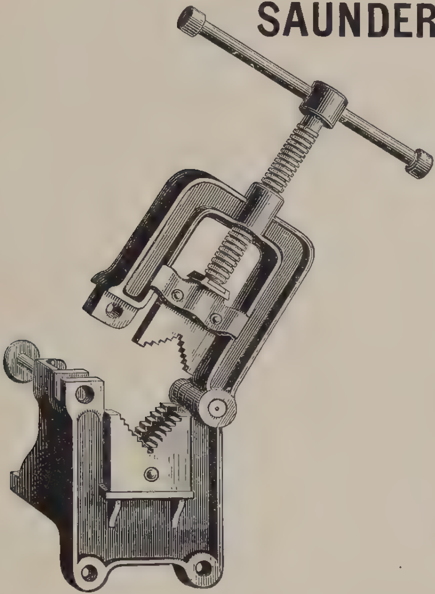


Fig. 450

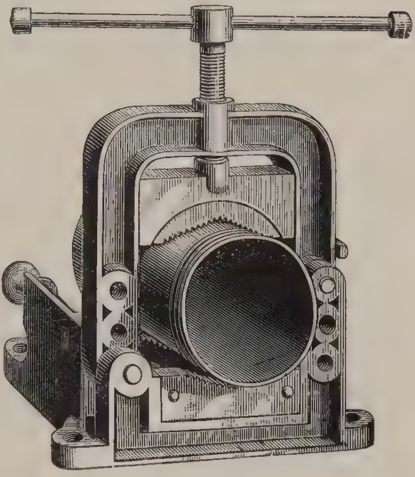


Fig. 451

PRICES

Fig. No.	450.	No. 1.	Holds	⅛ to 2 inch Pipe,	$10.00
" "	450.	" 2.	"	¼ to 3 " "	13.00
" "	451.	" 3.	"	½ to 4 " "	24.00
" "	451.	" 4.	"	2 to 6 " "	30.00
" "	451.	" 5.	"	2½ to 8 " "	45.00
" "	451.	" 6.	"	4 to 12 " "	70.00

WALWORTH PIPE VISES

PRICE

5 inch jaw, for pipe ⅛ to 6 inch,
each $18.00

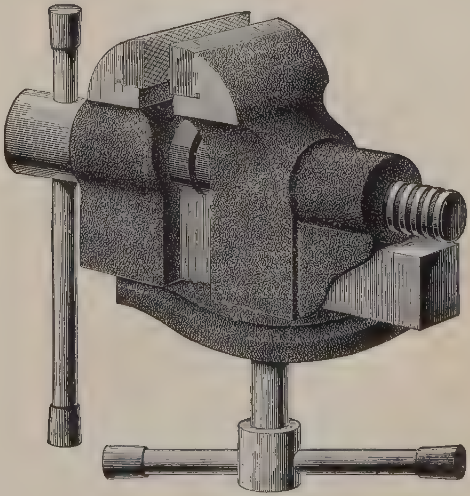


Fig. 452

BARNES' THREE WHEEL PIPE CUTTERS

NOS. 1, 2

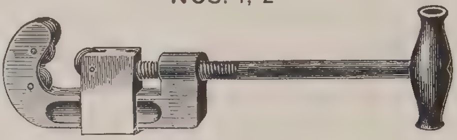


Fig. 453

NOS. 3, 4, 5, 6, 6½, 7

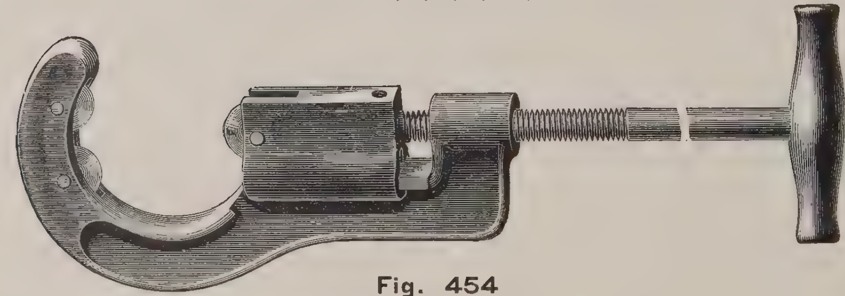


Fig. 454

PRICES EACH

SIZE	CUTS	CUTTERS COMPLETE	WHEELS	PINS PER DOZEN	HOOKS	SLIDES	NUTS	HANDLES
No. 1	⅛ to 1 inch	$4.50	$0.25	$1.00	$1.75	$0.75	$0.25	$1.00
" 2	½ to 2 "	6.00	.30	1.00	2.60	1.00	.25	1.25
" 3	1½ to 3 "	10.00	.40	1.00	4.55	2.00	Nut & Hook one piece in these sizes.	2.25
" 4	2½ to 4 "	20.00	.50	2.00	9.50	4.50		4.50
" 5	4 to 6 "	30.00	.75	2.00	13.75	7.00		7.00
" 6	6 to 8 "	40.00	.75	2.00	20.00	8.50		9.25
" 6½	8 to 10 "	45.00	.75	2.00	23.00	9.50		10.25
" 7	9 to 12 "	50.00	.75	2.00	25.00	11.25		11.50

STANWOOD PIPE CUTTERS

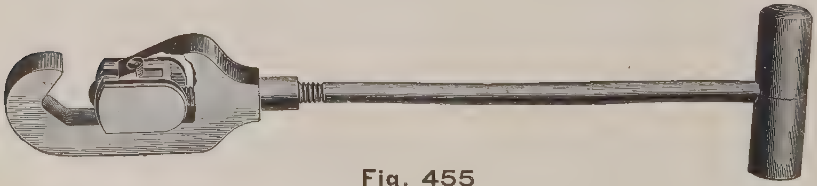


Fig. 455

PRICES EACH

SIZE	CUTS	COMPLETE CUTTERS	CUTTER BLOCKS WITH WHEELS	WHEELS	PINS
No. 1	⅛ to 1 inch	$1.50	$0.45	$0.12	$0.05
" 2	1 to 2 "	2.25	.60	.18	.05
" 3	2 to 3 "	7.00	1.25	.25	.10

SAUNDER'S ROLLER PIPE CUTTERS

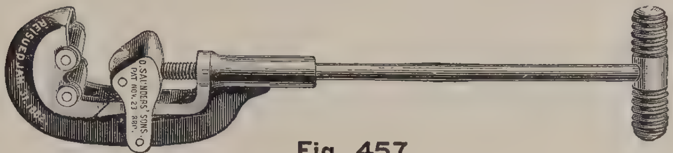


Fig. 457

PRICES EACH

Size	Cuts	Complete Cutters	Blocks and Wheels	Wheels	Rollers	Pins
No. 1	⅛ to 1 inch	$3.00	$1.25	$0.24	$0.24	$0.10
“ 2	1 “ 2 “	4.50	1.75	.32	.32	.10
“ 3	2 “ 3 “	11.00	2.75	.60	.50	.15
“ 4	2½ “ 4 “	18.00	3.50	.60	.50	.15
“ 5	4 “ 6 “	28.00	4.00	.60	.60	.15

SAUNDER'S THREE WHEEL PIPE CUTTERS

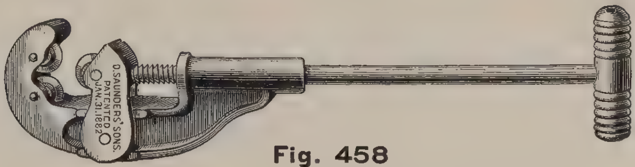


Fig. 458

PRICES EACH

Size	Cuts	Complete Cutters	Blocks and Wheels	Wheels	Pins
No. 1	⅛ to 1 inch	$3.00	$1.25	$0.24	$0.10
“ 2	1 “ 2 “	4.50	1.75	.32	.10
“ 3	2 “ 3 “	11.00	2.75	.60	.15
“ 4	2½ “ 4 “	18.00	3.50	.60	.15

SAUNDER'S TOOL CUTTERS

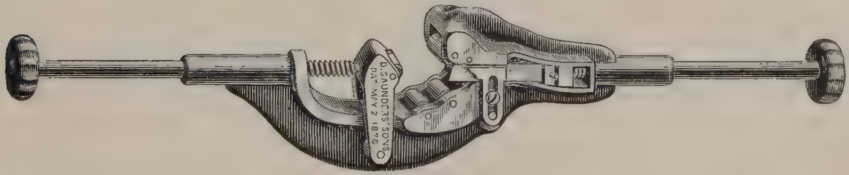


Fig. 459

PRICES EACH

Size	Cuts	Complete Cutters	Plain Rollers	Tools	Blocks & Rollers	Bead Rollers	Pins
No. 1	⅛ to 1 inch	$6.50	$0.24	$0.18	$1.25	$0.40	$0.10
“ 2	1 “ 2 “	8.00	.32	.25	1.75	.60	.12
“ 3	2 “ 3 “	16.00	.50	.35	3.25	1.00	.15
“ 4	2½ “ 4 “	25.00	.75	.45	4.25	1.25	.15

STILLSON PIPE WRENCHES

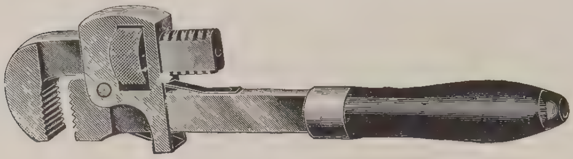


Fig. 460

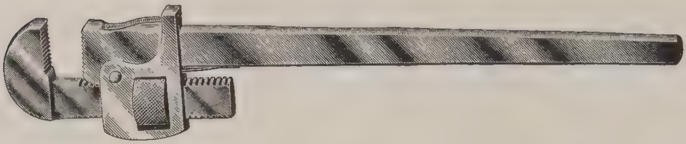


Fig. 461

PRICES EACH

Length open in inches	6	8	10	14	18	24	36	48
Takes from.............	⅛ to ½ in.	⅛ to ¾ in.	⅛ to 1 in.	¼ to 1½ in.	¼ to 2 in.	¼ to 2½ in.	½ to 3½ in.	1 to 5 in.
Prices	$2.00	$2.00	$2.25	$3.00	$4.00	$6.00	$12.00	$18.00
Jaws	.67	.67	.75	1.00	1.33	2.00	4.00	6.00
Frames	.25	.25	.33	.45	.55	.65	.75	1.00
Nuts	.20	.20	.27	.35	.42	.50	.65	.80

TRIMO PIPE WRENCHES

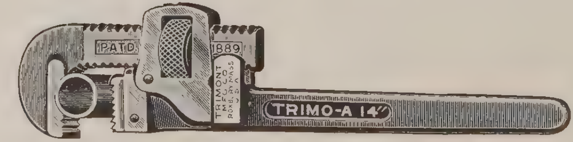
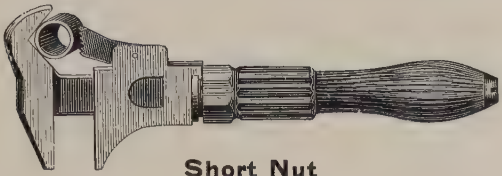

PAT'D
1889
TRIMONT MFG. CO. ROXB'RY MASS U.S.A.
TRIMO-A 14″

Fig. 462

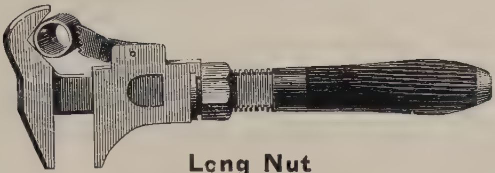
PRICES EACH

Length open in inches	6	8	10	14	18	24	36	48
Takes from..............	⅛ in. wire to ½ in. pipe	⅛ in. wire to ¾ in. pipe	⅛ in. wire to 1 in. pipe	¼ in. wire to 1½ in. pipe	¼ in. wire to 2 in. pipe	¼ in. wire to 2½ in. pipe	½ in. pipe to 3½ in. pipe	1 in. pipe to 5 in. pipe
Prices	$2.00	$2.00	$2.25	$3.00	$4.00	$6.00	$12.00	$18.00
Jaws	.67	.67	.75	1.00	1.33	2.00	4.00	6.00
Nuts	.20	.20	.27	.35	.42	.50	.65	.80
Inserted jaw	.25	.25	.33	.50	.55	.65	1.00	1.25
Frames	.25	.25	.33	.45	.55	.65	.75	1.00

ENGINEERS' WRENCHES



Short Nut
Fig. 463



Long Nut
Fig. 464

PRICES, PER DOZEN

SHORT NUT

10 inch, Bright Finish	$23.00
12 " " "	26.00
15 " " "	37.00

LONG NUT

10 inch, Bright Finish	$25.25
12 " " "	28.50
15 " " "	40.50
18 " " "	72.00
21 " " "	84.00

COE'S KNIFE HANDLE MONKEY WRENCHES

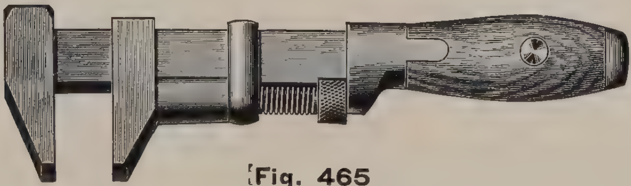


Fig. 465

PRICES, PER DOZEN

SIZE	BLACK	BRIGHT
4 inch		$10.00
6 "	$9.00	10.00
8 "	10.00	11.00
10 "	12.00	14.00
12 "	14.00	16.00
15 "	24.00	26.00
18 "	30.00	32.00
21 "	36.00	38.00

PACKER RATCHETS

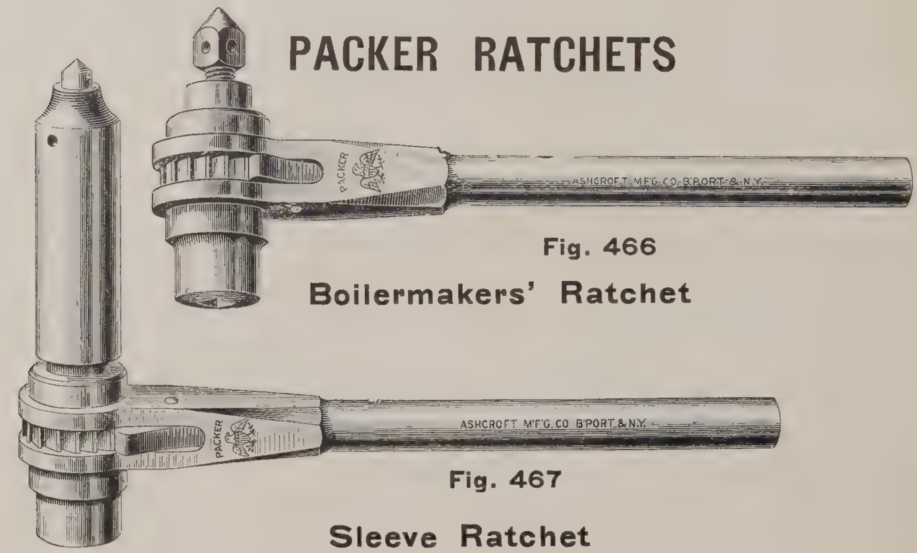

PACKER
ASHCROFT MF'G. CO. B'PORT & N.Y.
PACKER
ASHCROFT MF'G. CO. B'PORT & N.Y.

Fig. 466

Boilermakers' Ratchet

Fig. 467

Sleeve Ratchet

These Ratchets are adapted for Square Shank Drills only.

PRICES

No. 1.	Boiler Ratchet, 10-in. handle	each,	$9.00
" 2.	" " 12 "	"	10.50
" 1.	Sleeve Ratchet, 10 "	"	10.50
" 2.	" " 12 "	"	13.50
" 3.	" " 16 "	"	16.00
" 4.	" " 18 "	"	19.00
" 5.	" " 24 "	"	23.00

FLAT AND PIPE DRILLS

For Packer Ratchets

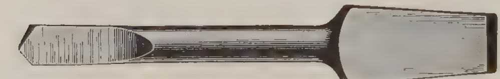


Fig. 468

PRICES

Flat Drills

Sizes,	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2	2 1/2	inches
Prices,	$0.40	.40	.40	.40	.40	.45	.45	.45	.50	.55	.60	.65	.75	1.00	1.00	each

Pipe Drills

Sizes,	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	inches
Prices	$0.91	.91	.95	.98	1.04	1.14	1.23	1.35	1.56	1.80	3.25	each

PACKER RATCHETS, "A"

With Morse Taper Shank Holes in Sockets

SOCKET FOR SQUARE SHANK DRILL.

Fig. 469.

MORSE SLEEVE

Fig. 470

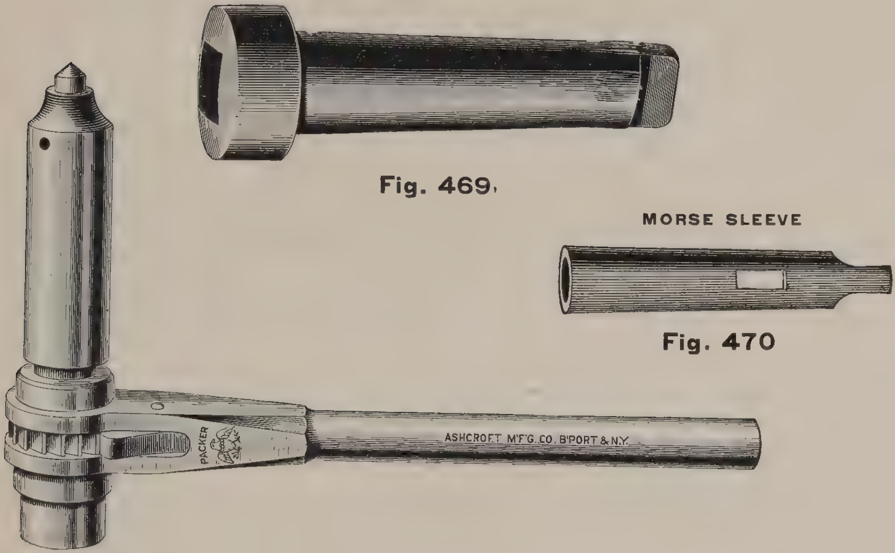

PACKER
ASHCROFT M'F'G. CO. B'PORT & N.Y.

Fig. 471

PRICES

No. 2A.	Ratchet 12 in. handle taking Morse Taper Shank drills $\frac{5}{8}$ in. to $\frac{29}{32}$ in., each	$16.00
No. 1.	Morse Sleeve taking Taper Shank drills $\frac{1}{4}$ in. to $\frac{19}{32}$ in. and fitting No. 2A Ratchet, each	1.80
No. 3A.	Ratchet 16 in. handle taking Morse Taper Shank drills $\frac{15}{16}$ in. to $1\frac{1}{4}$ in., each	20.00
No. 2.	Morse Sleeve taking Taper Shank drills $\frac{5}{8}$ in. to $\frac{29}{32}$ in. and fitting No. 3A Ratchet, each	2.40
No. 4A.	Ratchet 18 in. handle taking Morse Taper Shank drills $1\frac{9}{32}$ in. to 2 in., each	25.00
No. 3.	Morse Sleeve taking Taper Shank drills $\frac{15}{16}$ in. to $1\frac{1}{4}$ in. and fitting No. 4A Ratchet, each	3.00
No. 2.	Square Socket, fitting No. 2A Ratchet, each	1.75
No. 3.	" " " No. 3A " "	1.75
No. 4.	" " " No. 4A " "	2.25

NOTE

No. 2A. Packer Ratchet with No. 1 Morse Sleeve will take Taper Shank drills from $\frac{1}{4}$ to $\frac{29}{32}$, inclusive.

No. 3A. Packer Ratchet with No. 1 and No. 2 Morse Sleeve will take Taper Shank drills from $\frac{1}{4}$ to $1\frac{1}{4}$, inclusive.

No. 4A. Packer Rachet with Nos. 1, 2, and 3 Morse Sleeve will take Taper Shank drills from $\frac{1}{4}$ to 2 inches, inclusive.

ARMSTRONG ADJUSTABLE PIPE STOCKS AND DIES

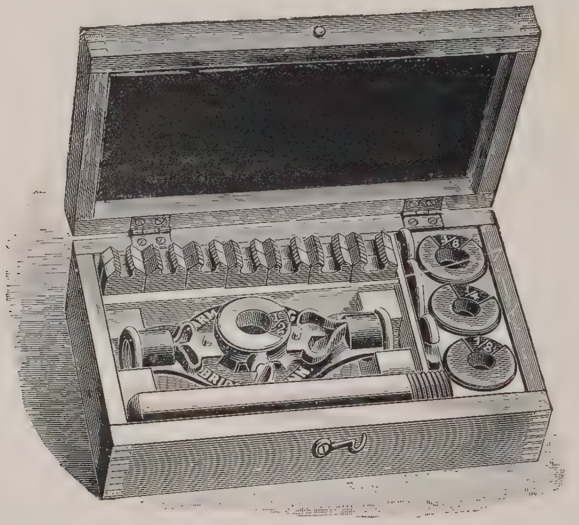


Fig. 472

Armstrong Stocks and Dies No. 1

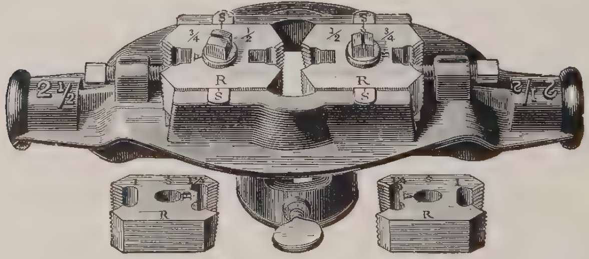


Fig. 473

Armstrong Stocks and Dies No. 2½

PRICES

Number	Threads	Complete	Stock Only	Extra Dies	Extra Bushings	Extra Wrenches
1	1/8 to 1/2 in.	$9.00	$3.25	$1.25	$0.20	$0.25
2	1/4 to 1 "	12.00	4.00	1.50	.25	.25
2½	1/2 to 1 1/4 "	12.00	4.50	3.25	.40	.25
3	1 1/4 to 2 "	20.00	7.00	4.00	.50	.50
4	1 1/4 to 2 "	18.00	7.00	3.00	.50	. . . . .
6	2 1/2 to 3 "	40.00	25.00	15.00	1.00	.50
7	2 1/2 to 4 "	60.00	30.00	16.00	1.50	.75

RULES

FOR THE MANAGEMENT AND CARE OF

STEAM BOILERS

UNDER THE SUPERVISION OF THE

Hartford Steam Boiler Inspection and Insurance Co.

1. CONDITION OF WATER

The first duty of an Engineer, when he enters his boiler room in the morning, is to ascertain how many gauges of water there are in his boilers. *Never unbank nor replenish the fires until this is done.* Accidents have occurred, and many boilers have been entirely ruined, from neglect of this precaution.

2. LOW WATER

In case of low water, immediately cover the fires with ashes, or, if no ashes are at hand, use *fresh coal*, and close ash-pit doors. Don't turn on the feed under any circumstances, nor tamper with nor open the safety valve. Let the steam outlets remain as they are.

3. IN CASE OF FOAMING

Close throttle, and keep closed long enough to show true level of water. If that level is sufficiently high, feeding and blowing will usually suffice to correct the evil. In case of violent foaming, caused by dirty water, or change from salt to fresh, or *vice versa*, in addition to the action above stated, check draft, and cover fires with fresh coal.

4. LEAKS

When leaks are discovered they should be repaired as soon as possible.

5. BLOWING OFF

Clean furnace and bridge wall of all coal and ashes. Allow brickwork to cool down for two hours at least before opening blow. A pressure exceeding 20 lbs. should not be allowed when boilers are blown out. Blow out at least once in two weeks. In case the feed becomes muddy, blow out six or eight inches every day. When surface blow-cocks are used, they should be often opened for a few moments at a time.

6. FILLING UP THE BOILERS

After blowing down, *allow the boilers to become cool* before filling again. Cold water pumped into hot boilers is very injurious from sudden contraction.

7. EXTERIOR OF BOILER

Care should be taken that no water comes in contact with the exterior of the boiler, either from leaky joints, or other causes.

8. REMOVING DEPOSIT AND SEDIMENT

In tubular boilers the hand holes should be often opened, and all collections removed, and fire-plates carefully cleaned. Also, when boilers are fed in front and blown off through the same pipe, the collection of mud or sediment in the rear end should be often removed.

9. SAFETY VALVES

Raise the safety valves cautiously and frequently, as they are liable to become fast in their seats, and useless for the purpose intended.

10. SAFETY VALVE AND PRESSURE GAUGE

Should the gauge at any time indicate the limit of pressure allowed by this Company, see that the safety valves are blowing off. In case of difference, notify the Company's inspector.

11. GAUGE COCKS, GLASS GAUGE

Keep gauge cocks clear, and in constant use. Glass gauges should not be relied on altogether.

12. BLISTERS

When a blister appears there must be no delay in having it carefully examined, and *trimmed* or *patched*, as the case may require.

13. CLEAN SHEETS

Particular care should be taken to keep sheets and parts of boilers exposed to the fire perfectly clean, also all tubes, flues, and connections well swept. This is particularly necessary where wood or soft coal is used for fuel.

14. GENERAL CARE OF BOILERS AND CONNECTIONS

Under all circumstances keep the gauges, cocks, etc., clean and in good order, and things generally in and about the engine and boiler room in a neat condition.

15. GETTING UP STEAM

In preparing to get up steam after boilers have been open, or out of service, great care should be exercised in making the man- and hand-hole joints. Safety valve should then be opened, and blocked open, and the necessary supply of water run in or pumped into the boilers until it shows at second gauge in tubular and locomotive boilers; a higher level is advisable in vertical tubulars as a protection to the top end of the tubes. After this is done fuel may be placed upon the grate, dampers opened, and fires started. If chimney or stack is cold and does not draw properly, burn some oily waste or light kindlings at the base. Start fires in ample time so it will not be necessary to urge them unduly. When steam issues from the safety valve, lower it carefully to its seat and note pressure and behavior of steam gauge.

If there are other boilers in operation, and stop-valves are to be opened to place boilers in connection with others on a steam pipe line, watch those recently fired up until pressure is up to that of the other boilers to which they are to be connected; and, when that pressure is attained, open the stop-valves *very slowly and carefully*.

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